The Heating and Ventilating Magazine

A Monthly Journal of Engineering Progress

MAY, 1926

Problems in Air Distribution

Field Studies of Air Flow in Typical Buildings, with Comments on Present Tendencies and a Prophecy as to Future Practice

Illustrated with Leaves from an Engineer's Sketchbook.

By Samuel R. Lewis

Consulting Engineer.

II.

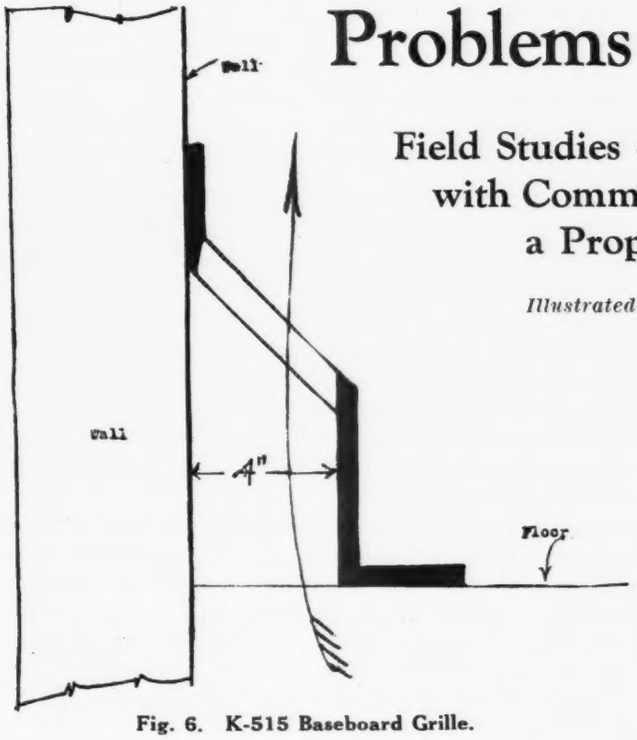

Fig. 6. K-515 Baseboard Grille.

IN a large club we have a swimming pool on an upper story, the room having exposed walls on three sides. Most natatorium rooms, which have cool walls, have the finish of the walls ruined by moisture. We lined these walls with 1½-in. of cork, in an attempt to insulate against this dew, and in addition delivered the fresh air, especially heated and controlled, vertically at the floor, through slots running the full length of the outer walls, using brass inlet grilles of the pattern in cross section. This is called K-515, the pattern number.

The warm floor, due to the pipes under it, and the vertical current of warm, dry air, plus the protected wall, are to keep the dew from falling. The room, having this elaborate distribution of supply air, is vented in a very simple manner at the ceiling at one corner, the spent air, little hurt by the few occupants, being passed through controlled reheaters to the dressing rooms and on to the exhaust fans which draw through grilles placed in the dressing rooms.

This method of letting one room supply another room, tending to move large volumes of air through from end to end, I believe, is coming more and more to be appreciated.

The main waiting room of the new Chicago Union Station has a great volume of fresh air supply, well distributed, near the floor, particularly near the entrances, where one would expect the fresh air. The vast room, however, is entirely innocent of any vent registers. It serves as a plenum chamber to supply the exhaust fans in the subsidiary rooms. This general idea, when carved out logically, gives excellent ventilation for all concerned, in many buildings, and saves a great many tons of steel ducts.

I was told the other day of one good-sized metropolitan ventilating system in which the ducts cost the contractor who built them an average of 40

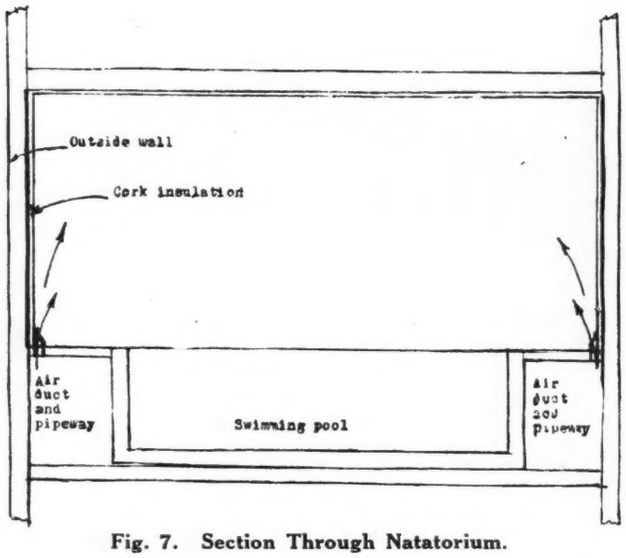

Fig. 7. Section Through Natatorium.

cents per pound. Quite a price for common galvanized sheet-steel! Some excuse for the growing tendency to use other materials than sheet-steel for air ducts!

IMPROVING THE APPEARANCE OF HEATING EQUIPMENT IN A GYMNASIUM

The same club house which has the natatorium has a big gymnasium on the top story. It has high windows, cold walls and roof, yet is entitled to look well, without suspended radiators cluttering up the walls and making the usual grimy dust marks.

We furred out the wall up to about 8 ft., with a tile partition giving a 12-in. clear space behind it. This space becomes an air supply duct 96-in. high and 12-in. wide, standing on edge. It is open on top. Suspended in this space near the top is a big pipe coil, arranged so that it can easily be raised up out of its pocket, with a few chain hoists, when necessary for repairs or painting. The cold wall behind it is insulated with cork. The warm wall in front of it becomes direct radiation.

Many grilles at the floor allow the coil to serve as an effective encased radiator. When the supply fan is operated, delivering air at say 60°, or at any temperature we may desire, we deliver cool air slowly, horizontally,—at the floor, as is presumably desirable for athletes, and deliver hot air vertically around three sides of the room, wiping the heat off the coils and delivering a good stiff breeze of hot air to take care of wall and ceiling chill. Vent grilles are at one end of the room.

Speaking of club houses, I believe that every department, within reason, of course, of a club house or kindred building where departments have intermittent occupancy, should have separate supply and exhaust fans. Many of them can profitably be equipped with separate supply and return mains for the direct radiators. The new dual control, with automatic temperature regulation, finds a useful application here.

Over and over we find large club houses in cities, seldom crowded except at luncheon time, with dining rooms served by general ventilating fans, and dining rooms ventilated all day long, even though empty 80% of the time. The natatorium of a club is subject to long periods of inactivity, yet many clubs have to ventilate the natatorium as long as they ventilate anything.

THE TREND TOWARDS INTERMITTENT VENTILATION

We are entering a period during which what seems to me more rational ventilation designs will be encountered, and in which the value of intermittent ventilation will be appreciated. For instance, in a State which has very rigid compulsory ventilation requirements, we have a plant now in service which serves three alternative functions. The building is a museum and art gallery of considerable proportions, with an art school using class rooms in the ground story, with an adjacent large auditorium.

All of these rooms are heated separately without aid from the ventilating plant. The administrative offices and lobby have a continuous air supply from the main supply fan, with independent exhaust fan. The class rooms are used most heavily in the hours during which occupancy of the galleries is only casual. When a crowd visits the galleries, as for

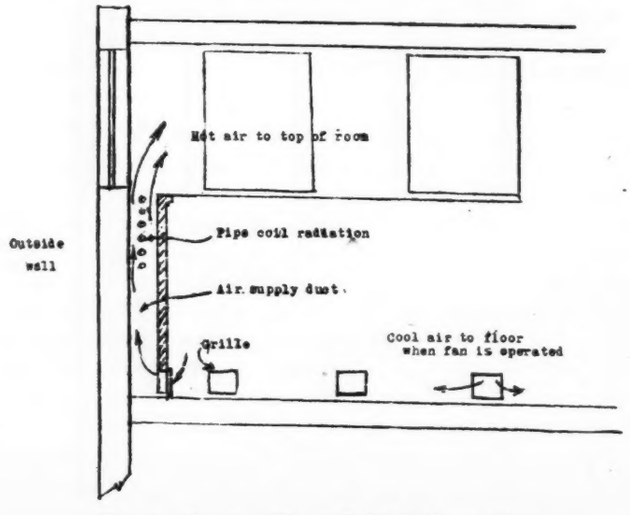

Fig. 8. Section Through Club Gymnasium.

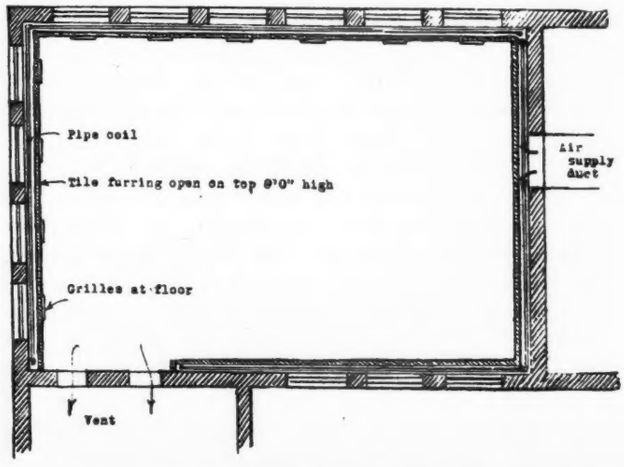

Fig. 9. Plan of Gymnasium.

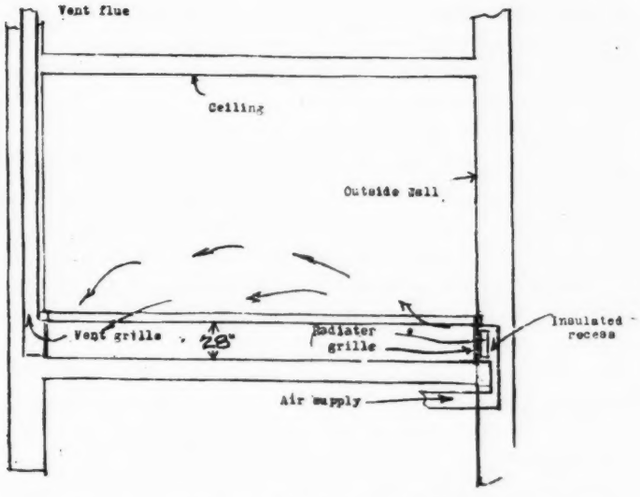

Fig. 10. Longitudinal Section Through an Art Gallery.

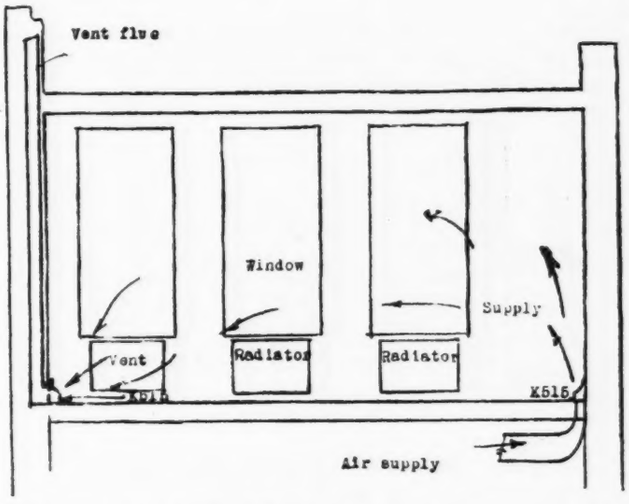

Fig. 11. Longitudinal Section Through a Classroom in Museum Building.

some reception or exhibition, the class rooms are likely to be vacant. The times when the auditorium and the class rooms are in service contemporaneously are very rare.

Therefore the supply fan is calculated to serve the auditorium bountifully, and this volume, when not used in the auditorium, will give excellent ventilation in the class rooms, or will change the gallery air in ten minutes. The ducts and dampers, both supply and exhaust, are arranged to facilitate this switching with interlocked pneumatic dampers, operated from a switchboard in the superintendent's office. Thus, by manipulating the two pneumatic levers, without the knowledge of any of the occupants of either class rooms or galleries, the air may be diverted, for a few moments, from one to the other, giving an air change and doing away, at trifling expense either for investment or operation, with the traditional musty smell which clings to art galleries.

AN UNUSUAL METHOD OF DISTRIBUTION

The method of distribution of the air is peculiar. In buildings of this nature the walls are very heavy and the cold surfaces are rather small. There are no windows in the galleries. The walls must be preserved for hanging exhibits. The radiators are all low enough to come below a rail 28-in. high, and are all recessed with grilles in front of them. All are under automatic control from thermostats placed on the door jambs, thus saving wall space.

Air is introduced behind the radiators, which are usually at one end of each room, and is exhausted through grilles which present the same appearance as the supply grilles, at the other end of each room from the supply grilles, thus giving a positive wiping-out effect from one end to the other.

Since the air enters around the radiators through the very large grille area, the velocity is low. The mechanical wiping off of the heat by the air current makes for very quick results in heating and renders the automatic control of the radiators a necessity.

The air distribution in the class rooms is similar to that in the galleries, except that here it does not enter through the radiators. Grilles of cast-iron about 10-in. high, K-515, as was shown on the earlier sketch, with openings looking up, though standing at an angle of 45° and only 4-in. wide, are substituted for the conventional baseboards at opposite ends of the rooms. One is an inlet, the other an outlet and the same positive movement of air from one to the other is enforced. The class rooms have windows with conventional radiators under them.

The auditorium in this building has upward ventilation with a floor register under each seat, calculated for a velocity of about 100 lin. ft. of air per minute. This room has no heat loss except at the top, being surrounded by otherwise warm rooms. It has no top, in a manner of speaking, since the ceiling, designed to simulate the sky, is hung from the roof without visible means of support, and is open for several feet above the projecting ornamental shelves or "porches" at the margins of the room.

Conventional methods of ventilation would have made it necessary to abandon this unique and beautiful architectural design.

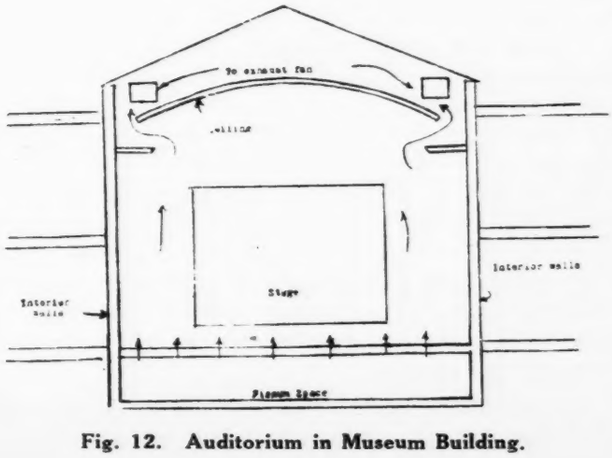

Fig. 12. Auditorium in Museum Building.

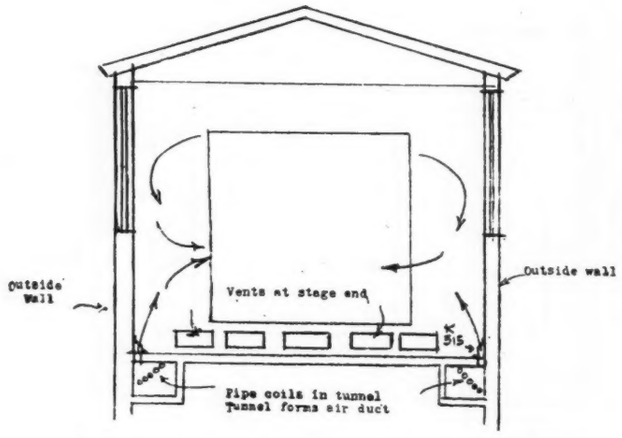

Fig. 13. Section Through Church Gymnasium.

Since such an interior room must have mechanical ventilation, anyway, I was glad to use a thoroughly-distributed upward system—especially as our problem for this room is nearly always one of cooling rather than heating. There are reheating radiators in the plenum space under the floor which will always keep the floor warm when heat is needed, whether air is being delivered through it or not.

This entire building is heated by forced circulation hot water. We have inserted thermostats in the water of the tempering heaters to close the cold air intake arbitrarily whenever, by any chance, the water gets cold enough to be in danger of freezing—or rather, unless the air compressor is running and this thermostat is comfortably warm, no fresh air can pass special extra intake dampers provided for this purpose.

ANOTHER ARRANGEMENT FOR A GYMNASIUM

A church built a gymnasium, which is also used for banquets and similar entertainments, as well as for an overflow Sunday School. The room is brick-lined, without furring, without any basement or attic, and has high windows on each side. Radiators could not be used at the floor of a gymnasium for fear of accidents by contact. Suspended radiators above the danger line interfered with the windows and violated the sensibilities of the architect. The room required mechanical ventilation for periods of heavy occupancy. There was no money to waste.

I used the same friendly cast-iron baseboard mentioned before, the full length of each side of the room, above a tunnel running down each side, the tunnel being 4 ft. x 2 ft. 6-in. I hung a pipe coil in this tunnel, the full length of each side, so that the air passing down the tunnel must cross through the pipes before it could rise into the room through the 4-in. wide slots along the sides. The vent grilles are in the face of the stage, and the spent air goes to a chimney behind the stage, or may return by working two doors, to recirculate through the tunnels.

Air supply is taken from the old fan which supplies the church, using that equipment when it would otherwise be idle, since use of this room and use of the church auditorium seldom overlap. The coils keep the floor warm and there is an excellent gravity circulation of air.

The janitor claims that he can start cold, on a —10° day, and heat the gymnasium, using the fan, in forty minutes. The vertical warm air delivery is excellent for either auditorium or gymnasium purposes, and the warm floor and full length distribution are excellent counter-irritants for the downdrafts that must come from the infurred cold walls, single windows and thin roof.

ENCLOSED RADIATORS IN RESIDENCES WITH FRENCH WINDOWS AND STONE FLOORS

Recently there has developed a frequent use, in fine residences, of French windows and stone floors, and a desire to hide the radiators. I know of no meaner thing to make a living room so equipped, livable in a blizzard, especially when there is no basement under it. We have developed the following scheme to handle such a situation. It seems to be effective in distribution.

The room is exposed on three sides, and is all doors. On the interior side it opens into an equally large stone paved room, with a fireplace at the far end. We couldn't have radiators. We could get a continuous grille in the floor all of the way around the exposed sides, but were limited to 10-in. in width. I think such a grille puts up a better appearance, anyhow, than the conventional big floor registers.

We made the architect give us a tunnel under this grille big enough to work in, or 48-in. x 36-in. The grille is divided by an insulated partition. The cold air falling down the glass and wall is induced to fall on down through the outer 5-in. of the grille, into the tunnel, where it is persuaded to turn around and rise through plenty of pipe coil radiation which is in two separately-valved layers, so that we may have some temperature control. The air then passes back into the room. The air movement, I take it, will get a kick down because of the heat.

As a measure of insurance we also have a pair of propeller-type recirculating fans in the tunnel which can, if necessary, pull down through half of this structure and deliver up through the other half, but this is only for insurance purposes, and

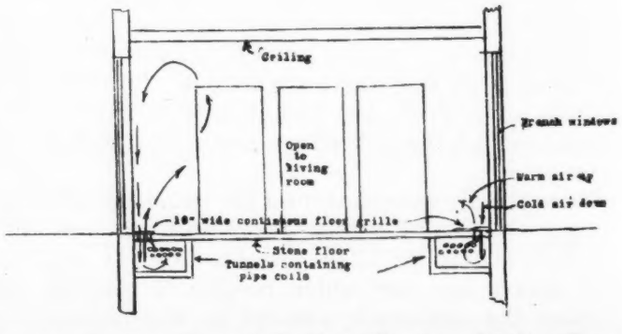

Fig. 14. Section Through Enclosed Porch and Living Room.

I do not apprehend that the fans will be needed. Assuredly we will have a warm floor around the edges, due to the radiant heat from the coils. For fear, with low-pressure steam, that only one end of the coils might be hot, we run one coil one way and the other the opposite way, so that the supply end of the upper one is over the return end of the lower one.

HOW THE K-515 IDEA WAS ADOPTED IN A SCHOOL BUILDING

In a school building which has concrete joist construction we used the K-515 idea, with the long radiators recessed under the continuous windows, suspended above the inlet slots through which the air supply from the fan is delivered. The entering tempered air is distributed satisfactorily, whether or not the radiators happen to be hot. When the radiators are hot the wall and glass chill and drafts are elegantly neutralized.

The spaces between the joists are used to carry the fresh air out from the supply flues to the inlet grilles. The same flues which bring in fresh air are available above the floor to serve as vent flues. Four such flues of small size usually are easily obtainable for each tier of rooms in a three-storied school.

The mechanical wiping off of the heat from the radiators by the incoming air gives very rapid heating and exceedingly high radiator efficiencies. We have some rooms in service this winter equipped this way and having radiator shields, and some rooms without them.

The assembly halls in the buildings which have these air-distributing methods are treated the same as were described for the church gymnasium.

My impression from these experiences is that the tendency of this person is toward upward heating and ventilation, and toward the use of slots,

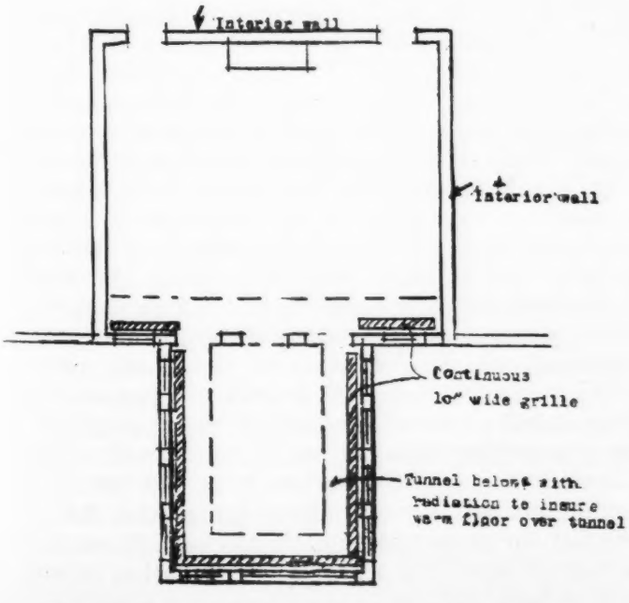

Fig. 15 Plan of Enclosed Porch and Living Room.

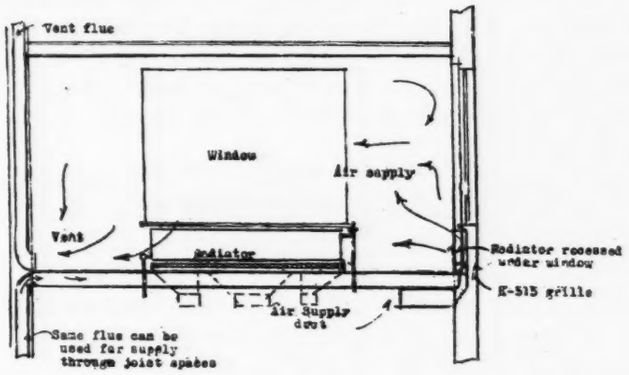

Fig. 16. Section Through a Classroom in a School.

and toward using hot concrete, stone, plaster, or even wood for visible radiation, rather than to employ the conventional dirty direct radiator.

A Health Official's View of the A. P. H. A. Open-Window Resolution

By Dr. P. H. Bryce, M. A.

IT IS not often that an old member and ex-president of a society such as the American Public Health Association feels called upon to criticize, instead of defend, its resolutions; but since, at its last meeting, the following resolution, after several preambles was adopted, nothing is left for those who disagree but to indicate it by their protest. The resolution reads:

> "Resolved, that the system of ventilating schoolrooms by fresh untreated outdoor air, admitted at the windows, with gravity exhaust ducts for removing vitiated air from near the ceiling is the most generally satisfactory method of school ventilation.
>
> "Be it resolved that we recommend that State laws and city regulations interfering with such scientific and economical methods of school ventilation should be repealed in the interest of the public health."

The adoption of the resolution is all the more remarkable since it includes such a crude statement as "the supply of as large an air volume in schoolrooms as 30 cu. ft. per minute per capita is necessarily accompanied with dangerous overheating," without in any way stating whether it is proposed to pour a similar amount of cold air in by the windows to supply what we suppose is accepted as the required amount, that is, some 2000 cu. ft. per person per hour, and, if so, whether it is to be by one or several windows, whether on the windy or protected side of the room, and at what rate or what is to be the size of the gravity exhaust ducts and their rate of extraction.

The writer prefers to think that some amateur enthusiast, who has been studying English School Reports, in the hurry of business in the Council, "got away" with his resolution without its being fully examined or the effect of its passing being understood.

The writer, therefore, desires to indicate some of the more important facts, which make such a resolution impractical in all northern climates, and especially in Canada.

1. Assuming that 66° F. is a proper temperature for schoolrooms, offices and houses for all normal persons engaged in sedentary occupations, it is clear that in weather varying from 32° F. to 20° F. outdoors, as it was here yesterday, making house-warming difficult even with double windows, no open-air system can be tolerated where cold air flows directly in through windows, except in *Preventoria,* where the children sit dressed in furs with caps, mittens and overshoes.

2. To allow "free untreated air" to enter schoolrooms in cities where soft coal is burned means that desks and books are soon soiled with coal dust, while throats are irritated from its inhalation. Hence some method of filtering the air is necessary.

3. Since air at zero holds only 0.5 of a grain of water per cubic foot as vapor and air at 70° F. holds 8 grains, it means that the room atmosphere will *with untreated air* have a relative humidity as low as 25%, with the result that a room temperature of 75° F. will be required owing to excessive loss of body heat through increased evaporation from the skin and mucous membrane.

4. It must be recognized that all human habitations in cold climates create an *artificial climate* in which air movements, such as we endure when warmly dressed in moving outer air, are impossible and hence artificial means must be adopted to cope with the changed conditions, and this means mechanical ventilation. Three days ago the writer with a standard air-meter examined some of the chambers in the Parliament Buildings in Ottawa, heated from a large central heating plant through steam radiators. The great chamber with a 40.-ft. dome is kept pleasantly warm by a series of inlets for fresh warm air, with corresponding outlets, having a relative humidity constantly of 50% to 55%. So complete is the air distribution in the Senate Chamber that drafts are not noticed by sensitive old men and the room temperature with the proper humidity stands at 67° F.

5. But to show that only mechanical aids will serve to cope with difficult conditions, the air of the stenographers' room was tested, where during the sessions of Parliament, 60 persons are busy in a room 80 ft. x 30 ft. x 10 ft. The ventilation of the room consists of four 2 feet square inlets, and an equal number of outlets on an inner wall, which has doors opening on the hall, which is heated from a large inlet a hundred feet away. The ducts were working badly as a door into the hall, as well as four fanlights, were open. These being closed the following result was obtained:

The ducts began delivering air at the rate of 5 ft. a second, pleasantly warm, delivering over 2,000 cu. ft. of washed air per hour per capita at a relative humidity of 55%, without drafts except when immediately under the ducts. Within 10 minutes the free movement of fresh air was distinctly noticeable as it was being changed six times an hour. As the floor space gives 40 sq. ft. to each person as compared with 25 sq. ft. in the average for schoolrooms, it is apparent that nothing except a definite, measured amount of air per minute driven into a closed room will serve to supply enough ventilation from hour to hour under such conditions.

6. At the moment of writing, in his study, while the outer air is —12° F. the writer finds the room temperature is 68° F. and the relative humidity 55%, due to an automatic humidifier in the warm air furnace, which supplies 1 1/3 gal. of water, as vapor every hour, along with a current of fresh outer air delivered in the flower room through a register to the amount of 10,000 cu. ft. per hour for six persons in a house having a cubic air space of 50,000 cu. ft. Owing to the "Law of Diffusion of Gases" this humidity is the same in every room in the house, and always under mechanical control.

7. It seems needless to multiply examples to illustrate the possibilities of mechanical means to supply fresh, washed, moist air to buildings whether large or small; while experience makes it equally plain that in cold, northern climates such a suggestion as is contained in the resolution is not only chimerical, but indicates that its sponsor and those who adopted it have not made themselves familiar with the factors of the ventilation problem or in any degree solved its difficulties in real cold climates.

Hot Water Supply for Miners from Colliery Waste Steam

THE success of an experiment in Nottinghamshire, England, of supplying hot water day and night to coal miners' cottages has caused much interest among builders and heating engineers. Officials of the British Ministry of Health have been giving attention to the method introduced by the Butterley Company, by which the waste heat available at a colliery in Kirkby-in-Ashfield is used to heat water that is supplied direct to 92 houses.

At Kirkby-in-Ashfield the water is conducted by copper or steel pipes from a tank that is heated by exhaust steam dicharged from the main winding engines. These pipes are taken along the walls of the houses inside, and thus tend to keep the houses warm and the walls free from dampness. Radiators can also be fitted to dry damp underclothing, etc. Where 100 houses are constructed within 1,000 yards of the colliery the approximate cost of providing this hot water supply with a sink in the kitchen and the bathroom is £13 10s. (approximately $67.50) for steel piping, and £16 4s. ($81.00) for copper piping. It has been found that the loss of heat on a 1,200-yard circulation is very small indeed.

This is the seventeenth lesson of
The Heating and Ventilating Magazine's

New Home-Study Course in Gravity Steam and Water Heating

Lesson No. 17

By Ara Marcus Daniels

HEATING with steam is accomplished as follows:—(1) Water is boiled and changed to steam, (2) the steam passes through a system of piping to the radiator, (3) air that entered with the steam is removed from the radiator, (4) the steam condenses within the radiator, giving up to the radiator the latent heat of evaporation, (5) the condensed steam flows from the radiator through the piping system back to the boiler to be re-evaporated.

The several types of steam-heating systems differ from one another in the manner in which the operations enumerated above are performed.

Work Problem S-2-1

In general, direct steamheating systems may be divided into two classes (1) gravity circulating systems, (2) mechanical circulating systems. The difference lies essentially in the manner in which the water of condensation from the radiating surfaces is returned to the boiler for re-evaporation.

In the first class, as the name implies, the water is returned to the boiler below the water line by gravity. Traps may or may not be used. The flow is due entirely to the static head existing in the returns, the system being a closed circuit. In this system, the same steam pressure exists in the boiler, mains and radiators except for slight reduction due to friction pressure losses occurring in the pipes that conduct the steam to the radiating surfaces.

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In the second class, as the name implies, mechanical means is employed for returning the water to a receiver or feed-water heater from which it is forced into the boiler by a pump or by return traps or by both. The system therefore does not constitute a closed circuit and the pressure in the boiler may be much higher than in the steam supply pipes or in the radiators. The receiver is usually vented to the atmosphere. In the case of vacuum systems, an additional pump is connected directly to the returns and discharges the condensation into the receiver. These systems are not covered in this course.

Instruction available to subscribers only. The first lesson appeared in November, 1924, but students can enroll at any time. Immediately upon enrollment, Lesson 1 will be sent you, together with the Work Problems pertaining to that lesson. Full directions will be included as to where to send solutions of the Work Problems.

The complete course consists of 30 lessons. They are divided into sections. Lessons 6 to 11 were devoted to water heating. Lessons 12 to 15 covered radiators and radiation. Commencing with Lesson 16 the subjects considered include gravity steam heating, steam and water boilers and cost estimating.

Price of course complete, with copies of text and problem sheets in convenient loose-leaf form, arranged by colors for different parts, and fully indexed for cross reference, $120 payable in equal monthly installments of $10. This includes a critical analysis of the Work Problems as solved by each student. An enrollment blank will be sent you upon request, together with full directions for securing all the benefits of the instruction. Students who satisfactorily complete the course will be awarded a Graduation Certificate.

CLASSIFICATION OF GRAVITY STEAM SYSTEMS

Gravity steam heating systems may be considered as of eight types, namely, (1) Strictly one-pipe system (sometimes called a camel-back system), (2) One-pipe circuit system with wet or dry return, (3) One-pipe relief system with wet or dry return, (3) One-pipe relief system, (4) One-pipe overhead system, (5) Two-pipe dry-return system, (6) Two-pipe wet-return system, (7) Two-pipe low-pressure gravity vapor system, with or without radiator return traps, (8) Two-pipe steam system with return traps.

The general arrangements of the piping for each of the types enumerated are shown in Fig. S-2-1 to S-2-8 inclusive, each being taken up in detail in subsequent lessons and design problems assigned in connection therewith.

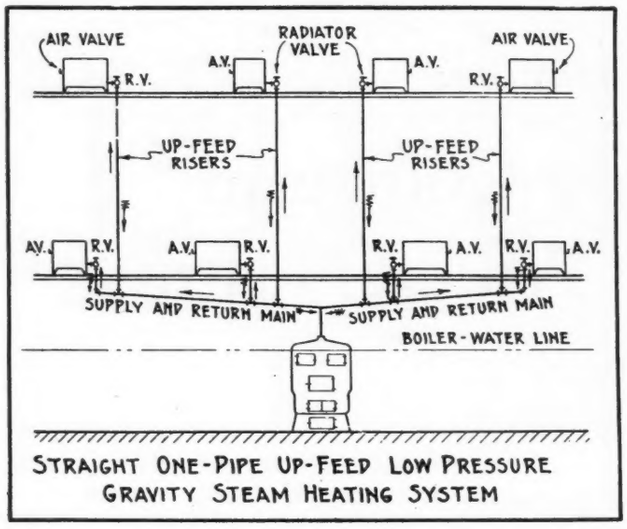

Fig. S-2-1

STRICTLY ONE-PIPE STEAM SYSTEM

Fig. S-2-1 shows the simplest form of a one-pipe steam heating system. With this arrangement of piping, steam leaves the boiler, and passes into the steam mains which may lead in one or several directions, and are graded up from the boiler. Risers are connected to the steam mains, and through these, the steam passes to the radiators, entering at the bottom of one of the end sections. The steam flowing through the mains and risers drives the air in the pipes ahead of it into the radiators from which it is exhausted through one of several types of air valves connected on the end radiator section opposite the supply connection.

With this arrangement, the water of condensation in the radiator drains down the supply riser into the mains and finally flows back into the boiler. The direction of the flow of the condensation in this system is therefore opposite to that of the steam. In the risers this is not particularly objectionable, but in the mains, interference is likely to prove an annoyance. Therefore, it is necessary with this type of system to design the mains so that the steam will flow therein at a very low velocity.

If this provision is not observed, and the flow of steam interferes with the flow of water in an opposite direction, the steam will pick up quantities of water, drive it to the end of the main, and cause "water hammer," a loud intermittent cracking noise, particularly objectionable when steam is first turned into a cold system when the rate of condensation is much higher than after the system has warmed up.

Work Problem S-2-2

ONE-PIPE CIRCUIT SYSTEM
(Wet or Dry Return)

Fig. S-2-2 illustrates this type of system which is the most common form of a one-pipe steam system. It has much to commend it as compared to the strictly one-pipe system shown as Fig. S-2-1.

In this system the steam main leaving the boiler is graded downwards from the boiler. Risers supply the radiators, as in the previously-described system, as well as carry the condensation back to the main. In the main, however, the condensation flows in the same direction as the steam which constitutes a distinct point in favor of this system. The steam main extends around the basement so as to supply all radiators and at its end or ends, a drop is made to a height such that the water will flow back to the boiler.

This return line may be run as a wet return (shown on the right of Fig. S-2-2) or as a dry return (shown on the left of Fig. S-2-2. It should be noted that the distinction depends upon the location of the return line with respect to the boiler water-line. If lower than the water-line, it is called a wet return, if higher than the water-line until near the boiler, it is called a dry return.

Work Problem S-2-3

ONE-PIPE RELIEF SYSTEM

Fig. S-2-3 illustrates a one-pipe relief steam heating system, sometimes erroneously referred to as a two-pipe system. It takes its names from the fact that the steam main is relieved of condensation at various points; in fact, whenever a riser is taken from the main and because there is a direct connection between the return line and radiator, thus permitting the condensation from the radiator to be carried immediately to the return line, instead of requiring it to flow through a part of the steam main to its end before dropping into the return line. The return is run as a wet return. The steam main is placed close to the basement ceiling, and conserves head room. It properly falls in the one-pipe class since there is but one connection to the radiator.

Work Problem S-2-4

ONE-PIPE OVERHEAD SYSTEM

Fig. S-2-4 shows a one-pipe overhead steam system, in which the steam main is carried direct to

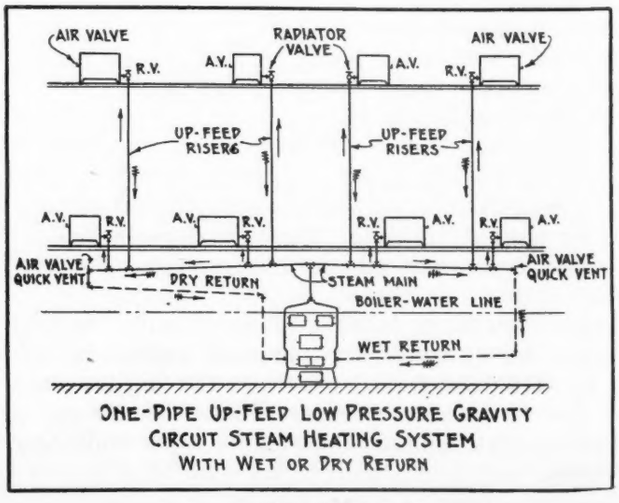

Fig. S-2-2

the attic before any radiators are supplied. It is then run around the attic and drop risers are connected thereto at such points as will accommodate the radiators on the several floors. These drop risers extend to the return line in the basement, with branches taken off for supplying the radiators. The return may be installed as a wet or dry return. In this system all steam and water within the system flow in the same direction. It is generally used for buildings having more than two stories where attic space is available. This system may be installed also as an up-feed two-pipe system, a description of which follows.

Work Problem S-2-5

TWO-PIPE UP-FEED DRY RETURN SYSTEM

Fig. S-2-5 shows a two-pipe dry return steam system. In a system with a dry return, the return main being above the water-line in the boiler, it is filled largely with steam. The supply connections are made in much the same manner as for one-pipe work. In addition, a return connection is made from the other side of the radiator with the return main. The condensation and steam thus have separate lines, and the steam has a free passage from the supply main, through the radiator, and into the return. The return thus will contain steam under a pressure but slightly less than exists in the supply main. The difference is due to the resistance caused by passage through radiator and piping. The end of each supply main is dripped into the return through a 4 or 5-ft. water seal. The water in this seal prevents the full steam pressure in the main from entering the return. It should be noted that in this type of two-pipe steam system, two valves are used on each radiator, one on the supply and one on the return. A feature of the dry return, sometimes considered objectionable, is the tendency at times, for steam to enter the radiator through the return valve, especially if, when starting up, this valve happens to be opened before the supply valve. Air may then be trapped in the radiator and interfere with proper heating of the radiator.

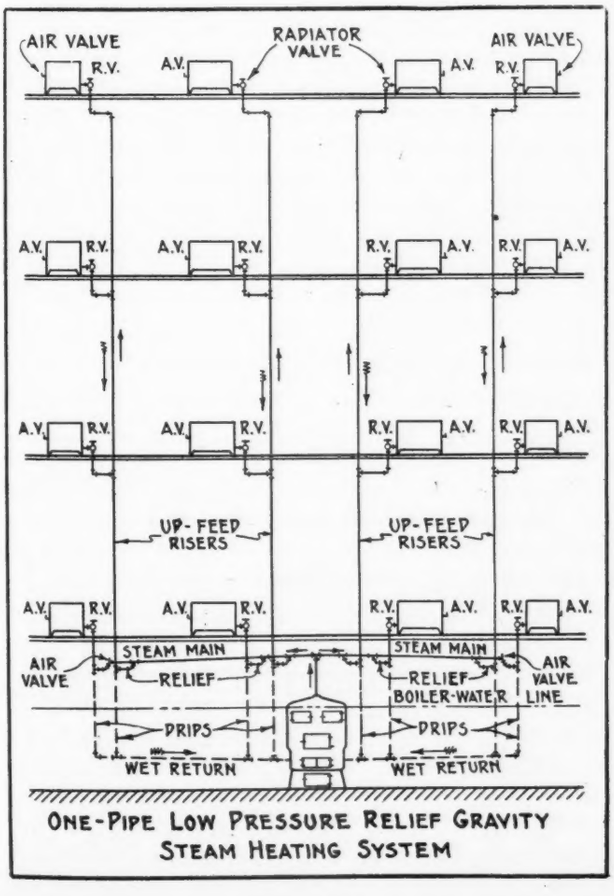

Fig. S-2-3

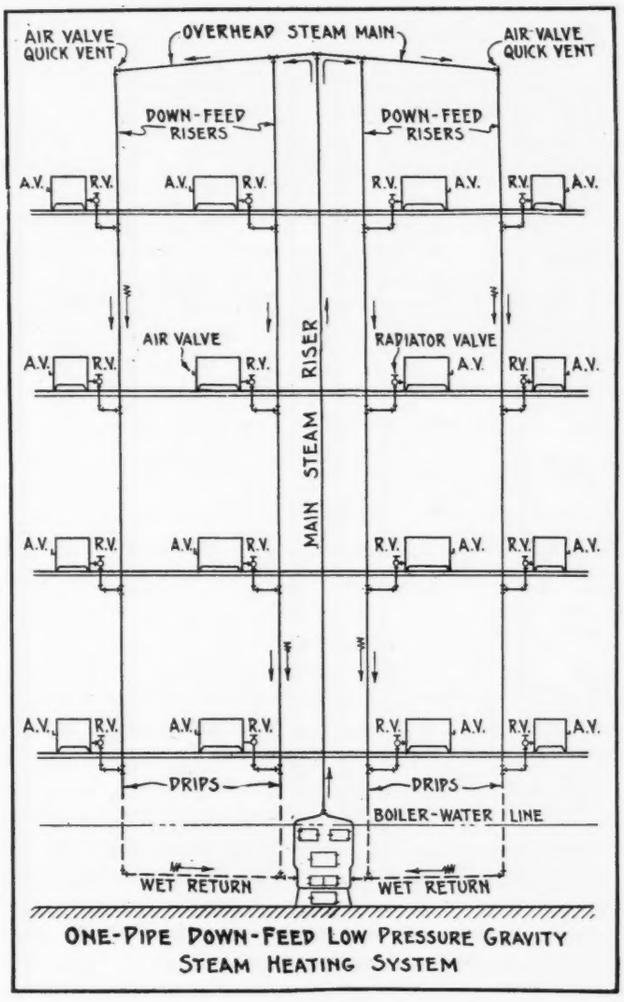

Fig. S-2-4

Work Problem S-2-6

TWO-PIPE UP-FEED WET RETURN SYSTEM

Fig. S-2-6 shows the arrangement of piping of a two-pipe up-feed wet return system. With this method of piping there is no possibility of steam entering the radiator through the return since separate connections are made to the return for each radiator, and each of these connections is water-sealed, as indicated by the heavy lines in Fig. S-2-6. The water in each of these return

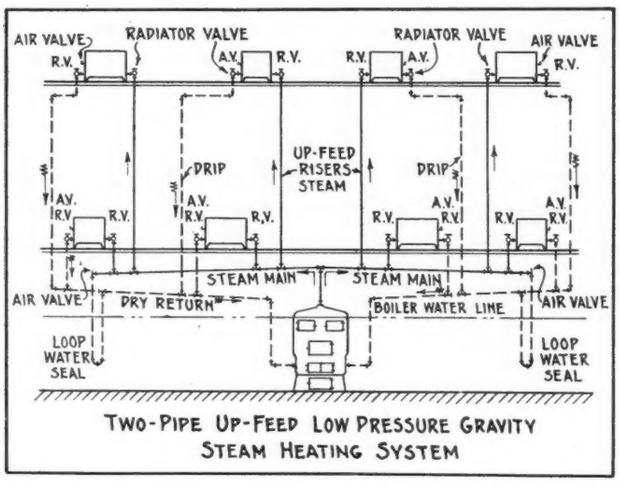

Fig. S-2-5

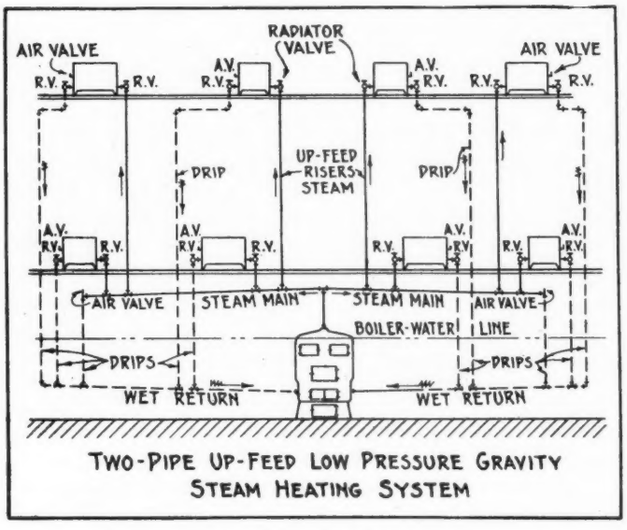

Fig. S-2-6

risers will stand a little higher than the water-line in the boiler. This difference in elevation is due to friction losses in piping and radiators, and consequent reduction or loss in pressure so that the water in the riser farthest from the boiler will rise high enough to balance the pressure drop between the two points. As the boiler is approached, this pressure drop will become less. Consequently, the height of water in the return risers near the boiler for radiators on the same floor will more nearly equal that of the water in the boiler. Therefore, sizes of pipe must be such as to avoid an excessive pressure drop. All radiators should be set at least 2 ft. above the water-line in the boiler. The wet return system is usually quieter than the dry return system since all condensation drops directly into the return, and does not travel in a horizontal direction and make a 90° turn at the end of the main.

Work Problem S-2-7

In general, two-pipe systems of the types shown in Fig. S-2-5 and S-2-6 employing two radiator valves are now seldom installed, having been superseded largely by the so-called vapor system illustrated in Fig. S-2-7.

TWO-PIPE LOW-PRESSURE GRAVITY VAPOR SYSTEM WITH OR WITHOUT RADIATOR RETURN TRAPS

Fig. S-2-7 shows an arrangement of piping for a gravity vapor system. As explained in the preceding lesson, vapor is steam at a pressure equal to or slightly above atmospheric pressure. Consequently a vapor system is a very low-pressure steam system operating at pressures but slightly above atmospheric pressure. Vapor systems have features that are essentially different from steam heating systems operating at a pressure from 1 to 5 lbs. gage.

Water-type radiators having top supply and bottom return are used. A supply valve of the graduated type which permits control of the quantity of steam admitted into the radiator is employed. No steam is permitted to enter the return lines which are open to the atmosphere or are maintained under a pressure slightly below atmospheric. The returns from the radiators must connect with the dry return main. The end of the steam main may be dripped to a wet return but must be vented into the dry return.

Work Problem S-2-8

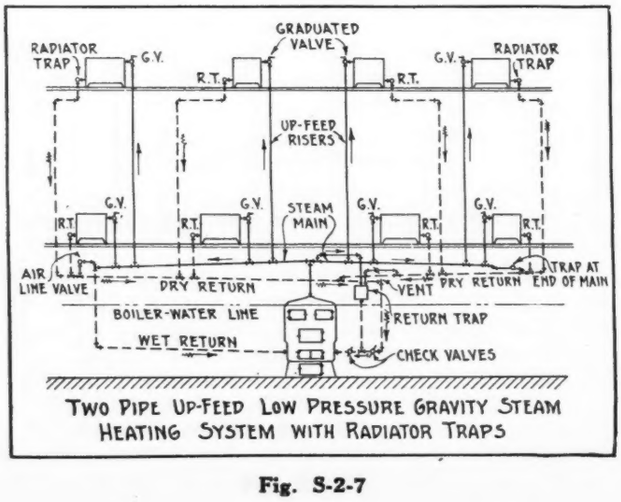

Fig. S-2-7

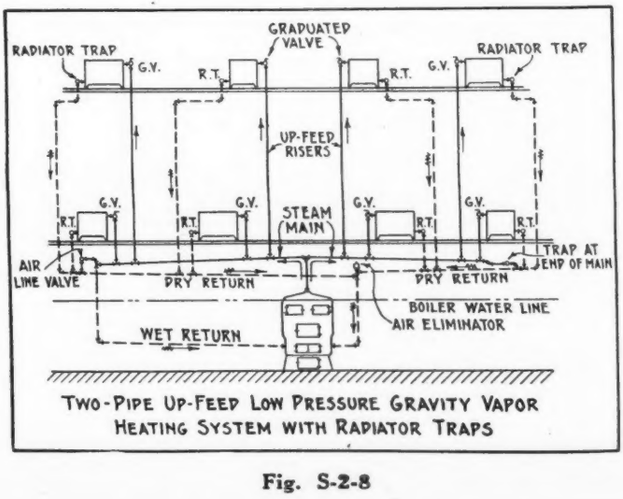

Fig. S-2-8

TWO-PIPE STEAM SYSTEM WITH RETURN TRAPS

Fig. S-2-8 shows a two-pipe steam system with return trap. The characteristic feature of this system is the trap, the function of which is to separate the air and water discharged into the dry return piping, to release the air and to return the water to the boiler, regardless of the pressure carried in the boiler or in the system provided it is within the maximum limit of the trap operating pressure, usually not exceeding 10 lbs. per square inch gage. Special radiator supply valves and radiator traps are required as indicated in the figure. No steam is permitted in the return mains.

Wet returns are usually connected direct to the boiler, and, therefore, are under the same pressure as that maintained in the boiler. Steam lines connecting the wet return must be vented to the dry return through air line valves. The dry returns are either open to the atmosphere or, by means of special vents, seal the returns automatically so as to maintain a vacuum within the system. Due to the large difference in pressure within the boiler and the dry return it is necessary to use special equipment to return to the boiler the condensation collecting in the dry returns. This is often done by using a direct return trap, which forces the condensation into the boiler by means of the steam pressure within the boiler. This will be explained more fully when this system is taken up in detail.

Work Problem S-2-9

FLOW OF STEAM IN PIPES

Before taking up the different systems of steam heating in detail and applying design problems for each, it is important that the principles governing the flow of steam in pipes be understood, at least, in a general way.

In order that a fluid may flow through a pipe, it is necessary that the fluid be under pressure so that it will move in spite of the friction caused by the inner surface of the pipe. Laws governing the friction of fluids in pipes have been established by experiment. They may be expressed as follows:

(a) The total frictional resistance to flow is independent of the absolute pressure of the fluid against the walls of the pipe. Thus, the frictional resistance is the same, regardless as to whether the pressure is 10 lbs. or 100 lbs. per square inch.

(b) The frictional resistance varies directly as the area of contact between the fluid and the pipe wall. The area of contact depends upon two things, the internal diameter of the pipe and the length of the pipe.

Fig. S-2-9 represents a section of pipe through which steam may be assumed to be flowing. The length denoted by L may represent any distance along a straight section of pipe. If this distance be doubled, the diameter D remaining unchanged, the frictional resistance to steam flow will be doubled or, in other words, frictional resistance for a pipe of given diameter will increase in the same proportion as the length increases.

If the diameter D be doubled and length L remain unchanged, the frictional resistance will be altered in a similar manner, but since the area of a pipe increases faster than its circumference for

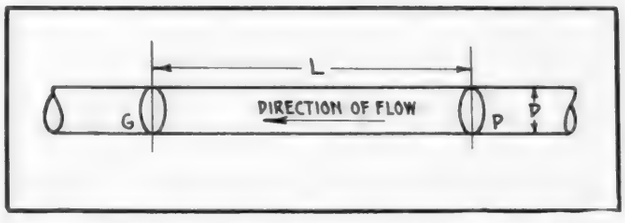

Fig. S-2-9. Basic Relation of Diameter and Length of Pipe to Steam Flow.

increase in diameter, a greater volume of steam will flow in a larger pipe and the net loss will be reduced.

Work Problem S-2-10

(c) The frictional resistance varies nearly as the square of the velocity. Thus, for a given frictional resistance, if steam is flowing in a pipe at a velocity of 10 ft. per second, by increasing this velocity to 40 ft. per second, with the other factors remaining the same, the resistance will be increased 16 times, obtained as follows:

$$40^2 \div 10^2 = 16$$

Work Problem S-2-11

(d) The frictional resistance varies directly as the density of the fluid. Thus the denser or the heavier the fluid, the greater will be the resistance. So, if the pressure of steam weighing 0.04976 lbs. per cubic foot at 5 lbs. gage is raised to 55 lbs. gage, at which pressure its weight will be 0.1609 lbs. per cubic foot, the frictional resistance will be increased as many times as the weight or density was increased. In this case it is 0.1609 divided by $0.04976 = 3.23$ times.

Work Problem S-2-12

The effect of frictional resistance is to cause a reduction in the pressure between different points in the pipe line. If, for Fig. S-2-9, the static pressure be measured at sections P and G, it will differ at the two points, due to the frictional resistance of the pipe. The pressure drop between sections P and G will be equal to the difference between the static pressures at the respective points. It is customary in practice to fix a definite allowable pressure-drop between points in a steam pipe line and then to determine the size of pipe necessary to permit the required amount of steam to pass in a given time; or the problem may present itself as follows:

To determine the drop in pressure in a pipe line of a given size and length when steam at a given

(Continued on Page 77)

The Answer—

"DOES Loose Sales Talk Pay?" was conceived, written and printed as a constructive article. Its main purpose was to cause responsible executives in the oil-burner industry to ask themselves the question that was used as a title and, of course, only one answer was possible. It was hoped that this article, which was divided into two parts, would bring about some sort of general reaction and definitely point the way towards a cleaner, better and, consequently, a stronger sales talk.

The reply to the question has been instantaneous and entirely unexpected in its sweep through the oil-burner industry. Several advance proofs were shown to executives of leading oil-burning manufacturers, located in or near New York, and the almost immediate reaction was the question, "What sort of code would place reasonable restriction on oil-burner advertising and literature and why not put such a code into effect, putting the same question to such executives as were within personal reach?"

THE BIRTH OF THE CODE

The result was the beginning of a flood of letters that indicates concurrence in the code by practically all of the leading manufacturers of mechanical draft burners. In Detroit at the recent convention of the oil-burner manufacturers, the matter was discussed with practically all of the exhibitors, and not a single objector was found.

It would appear to be only a matter of a comparatively short time before the entire industry is bound together in a code that, if lived up to, will absolutely preclude the mudslinging and acrimonious advertising which unfortunately has intruded into the past development of the industry.

As a specific example, a high executive of one of the largest and oldest manufacturers of oil burners in the country suggested, after agreeing to comply with this code, that it was not proper to preach what they did not practice. He then asked the writer to go over with him a very elaborate catalog that was just ready for the printer. This catalog was the joint production of the executives of this company and one of the most conservative advertising agencies in New York, yet more than twenty suggestions were made to bring the production within the limits laid down by the code.

Not a single instance was there of a statement intentionally misleading or out of conformity with good practice, but with the new viewpoint, many phrases were changed and became stronger and better sales talk in the changing. For instance, a statement was made that the burner performed some function "better than any other burner." By deleting this phrase and changing one or two words, a positive statement was made that was manifestly stronger and more compelling than the comparative one had been.

The very generous concurrence with all of these suggestions resulted in a presentation that is beyond all criticism on these grounds and the effect upon the public is certain to be without any reaction against this particular burner.

THE FIRST APPLICATION OF THE PLAN

Coincident with the working out of this plan, the matter was taken up specifically with the sixteen manufacturers advertising in THE HEATING AND VENTILATING MAGAZINE for April. Of these advertisements, nearly half were found to be beyond reproach, and in the other cases, the objection varied from the use of a single word in one advertisement to the remodeling of phrases and ideas.

This spontaneous, whole-hearted and almost complete agreement by and between the leaders in the oil-burning industry cannot but produce beneficial results. It means that the prospective purchaser of an oil burner will no longer read in three or four different catalogs that only one burner is the best, that all other burners but the one portrayed function on incorrect principles and so on *ad infinitum*. It means that heating contractors, engineers, architects and others who assume responsibility for judgment on the matter of oil burning in report, suggestion and recommendation to their plan, will have the whole matter placed before them in an entirely different and more compelling manner. It means, if the plan can be carried on to its ultimate end, a reduction of sales resistance that may very materially increase sales with no additional effort or expenditure.

THE HEATING AND VENTILATING MAGAZINE appreciates the opportunity of taking the lead in this matter and pledges the use of its editorial columns to such extent as may be justified by the increasing importance of the oil-burner industry to such presentation of facts, figures and constructive articles as will assist in a normal and proper development of the oil-burning industry.

to "Does Loose Sales Talk Pay?"

CALOROIL BURNER CORPORATION

New York City

April 23rd, 1926.

Heating & Ventilating Magazine.

Attention Mr. P. E. Fansler

Dear Sir:

We were very much interested in your article in the April number of your magazine, entitled "Does Loose Sales Talk Pay".

We are most heartily in accord with you and assure you of our co-operation.

Yours very truly,

CALOROIL BURNER CORPORATION

Director of Sales

THE TIMKEN-DETROIT CO.

GENERAL OFFICES

DETROIT, MICHIGAN

April 26, 1926.

Mr. P. E. Fansler, Associate Editor,
Heating & Ventilating Magazine,
1123 Broadway,
New York City.

Dear Mr. Fansler:

I am sorry you were unable to stop off in Detroit on your way East from Chicago, as I was looking forward to having a chat with you and particularly wanted to congratulate you on the two leading articles in the April number of your magazine. They are both excellent, especially the one entitled "Does Loose Sales Talk Pay". I feel this is a very constructive contribution towards the literature of the industry.

There is no doubt whatever that a large number of people who are still burning coal have refrained from changing to oil because the obviously exaggerated statements in certain types of advertising have made them suspicious of oil burners in general.

Anything that can be done to eliminate the "Bunk" from oil burner literature will certainly be of great ultimate benefit to the industry as a whole. You may count on us to support any movement which has this object in view.

Yours very truly,

H. Timme
General Manager.

THE SILENT GLOW OIL BURNER CORPORATION

HARTFORD, CONN.

April 3, 1926.

The Heating & Ventilating Magazine
1123 Broadway
New York, N. Y.

Attention - Mr. O. Peterson
Treasurer

Gentlemen:

Your communication of March 30th at hand and can assure you that we approve your action 100%.

We do not knowingly permit any of our agents or representatives to over criticise another burner and given the short enthusiasm another burner may be somewhat rampant we have endeavored to illustrate at all times that tearing down the other fellow's structure will never build our own.

Any suggestions you can offer at any time on our literature, advertising or policies will certainly be welcome.

Yours very truly,

THE SILENT GLOW OIL BURNER CORPORATION

Ralston H. Sherman, General Manager.

RAYFIELD MFG. CO.

AUTOMATIC FUEL OIL BURNERS

CHICAGO

April 23, 1926.

Mr. P. E. Fansler,
Associate Editor, Heating & Ventilating Magazine,
1123 Broadway,
New York, N.Y.

Dear Mr. Fansler:

We agree with you fully regarding the detrimental effects of loose sales talk which we recently discussed in Detroit and which you have so ably covered in your April issue.

There is no question but what the wild and exaggerated statements made by some burner manufacturers has created doubts in the public mind regarding the entire burner industry.

If oil burners cannot be sold on the basis of honest service and truthful statements regarding same, none of us can hope to gain the public confidence, which is so necessary for permanent success in any line.

If the reputable burner manufacturers will carry out your ideas, the status of the entire industry will be raised to a higher plane, and all of us will benefit accordingly.

Allow us to thank you for your constructive efforts along this line, and to assure you of our hearty co-operation.

Very truly yours,

RAYFIELD MANUFACTURING COMPANY

E. G. Read, Field Manager.

EGR/AS

WESTERN UNION TELEGRAM

RECEIVED AT COR. CONGRESS & SHELBY STS., DETROIT, MICH. ALWAYS OPEN.

1926 APR 8 AM 11 09

CX320 17

TB CHICAGO ILL 8 950A

869

P E FANSLER

BOOK CADILLAC HOTEL DETROIT MICH

WE ARE FOR YOUR CAMPAIGN FOR CLEAN LITERATURE AND COMPETITION

AS DISCUSSED COUNT ON OUR FULL COOPERATION

MCILVAINE BURNER CORP.

Winslow Boiler and Engineering Co.

Kleen-Heet

CHICAGO

April 12th, 1926

Heating & Ventilating Magazine,
3 Broadway,
York, N. Y.

Sir:- ATTENTION: Mr. P. E. Fansler

The writer wants to compliment you most on your article, "Does Loose Talk Pay", appears in the April issue of the "Heating and ting Magazine".

We have studied the excerpts from various advertising and agree with you most

There are so many truths that may be the sales of oil burners, that one wonders k of mind can conceive the idea that such claims really promote sales.

We have no hesitancy in advising you that ing policy will continue as it has been . We aim to maintain our position in the world through advertisements that tell

Yours very truly,

WINSLOW BOILER & ENGINEERING CO.

GENERAL SALES MANAGER

MEH:MOC

AMERICAN NOKOL COMPANY
AUTOMATIC OIL HEATING
FOR THE HOME
CHICAGO

April 12, 1926.

Mr. P. E. Fansler,
c/o Heating & Ventilating Magazine Co.,
1123 Broadway,
New York, N. Y.

Dear Mr. Fansler:

Referring to your letter in the oil burner industry, we are glad indeed to know that you have undertaken a thing of this kind, and assure you of our unqualified support to the extent that we will be glad to join with any reputable group of oil burner manufacturers in working to a code that will call for

1 - The elimination of all comparative statements other than those the truth of which can be easily proved and demonstrated.

2 - The elimination of superlatives.

3 - Presenting only such statements of facts as might be unControversibly supported by figures.

We assure you that we will be very glad indeed to co-operate in every way within reason toward cleaning up this advertising situation among oil burner companies in the manner undertaken by you.

Yours very truly,

AMERICAN NOKOL COMPANY

By _____ President

SCODNY BURNER CORPORATION
26 BROADWAY
NEW YORK CITY.

April 8,1926

Mr. P. E. Fansler, Associate Editor
The Heating & Ventilating Magazine
Book-Cadillac Hotel, Detroit, Mich.

Dear Mr. Fansler:

Referring to our recent conversation on the subject of ethics in oil burner advertising and literature, I wish to supplement my remarks by the following comment.

I feel that our company will be very glad to do everything within its power to bring about a more uniform and more accurate statement of fact in claims made in advertising and discussion of the subject.

It seems to us that in view of the fact that the introduction of the oil burner to the public is in its early stages and has yet to win its spurs as a household utility, that all manufacturers and marketing organizations should be guided by the following principles.

1-To eliminate any statements that cannot be substantiated.

2-The disuse of superlative descriptions referring to the burner and its operation.

3-The elimination of odious comparisons whose only result can be to depreciate the value of the oil burner in the home.

I believe as I told you, that if the outlined principles are adhered to by the industry as a whole, a great deal of controversy that only leaves the public uncertain as

W. S. RAY MANUFACTURING CO.
RAY ROTARY FUEL OIL BURNERS
RAY STEEL RANGES - OIL BURNING EQUIPMENT
NEW ADDRESS
720 CASS STREET
CHICAGO, ILL.

April 9, 1926

Mr. P. E. Fansler, Associate Editor
The Heating & Ventilating Magazine
New York City

Dear Mr. Fansler:

The W. S. Ray Manufacturing Company will find it no hardship to join with you in your admirable plan to put oil burner advertising on a sound basis, and heartily concur on the points you have established; viz.: the elimination of all superlatives, making no statements of a comparative nature, and using only statements of facts that are facts, and

your plan to secure the
e manufacturers in the
of the greatest value
velopment.

ely,
NUFACTURING COMPANY
R. Ray
sident

S. T. JOHNSON CO.
OIL BURNER EQUIPMENT
SAN FRANCISCO, CAL.
OAKLAND, CAL.
SACRAMENTO, CAL.
CHICAGO, ILLINOIS
PHILADELPHIA, PA.

E. E. Fansler, Associate Editor,
Heating & Ventilating Magazine,
1123 Broadway,
New York City.

April 15,1926.

Dear Mr. Fansler:-

The S. T. Johnson Company will be very glad indeed to join with you in your campaign to secure a higher grade of advertising and other publicities in the oil burner industry.

based upon: My understanding is that your campaign is

(a) - The elimination of superlatives.

(b) - The elimination of comparative statements

(c) - The elimination of statements of alleged facts, unless they can be readily proven.

Very truly yours,

S. T. JOHNSON CO.

By _____

Aetna Automatic Oil-Burner Inc.
The Oil Burner of Distinction
EXECUTIVE OFFICES AND SHOWROOMS
JOHN SCHLESINGER, JR. PRESIDENT
Providence, R.I. April 12, 1926.

Mr. P. E. Fansler,
The Heating & Ventilating Magazine,
New York City.

Dear Mr. Fansler:-

I am entirely in accord with your movement to place the literature and advertising of oil burner manufacturers on a sound footing, and will be glad to pledge the Aetna Automatic Oil Burner, Inc., to adhere to the code of ethics you have outlined. I will be glad to have you go over our proposed literature, from time to time, and make such suggestions as will be helpful in attaining this end.

Sincerely yours,

John Schlesinger, Jr.
President

PETROLEUM HEAT AND POWER COMPANY
OIL BURNING EQUIPMENT
DISTRIBUTORS OF FUEL OIL
111 FIFTH AVENUE
NEW YORK

April 29, 1926.

The Heating & Ventilating Magazine,
1123 Broadway,
New York City.

Attention of Mr. P.E.Fansler -
Associate Editor

Dear Sir:

Pursuant to the several conversations we have had concerning the best methods to be used in presenting our Petro domestic burner to the public, we wish to advise you that it will be our policy to adhere to the highest possible standards. We certainly intend to keep away from exaggerated statements, to avoid any reference to competitors and to make no statements of fact that can not be satisfactorily proven.

Our belief is that even from a selfish standpoint any policy, other than indicated above, would be detrimental not only to ourselves but to the entire oil burning industry. We are heartily in accord with your efforts to promote a sound, ethical and conservative presentation of the merits and advantages to be derived from the use of oil as fuel and wish you every success.

Very truly yours,

W. C. McFarlane
President

Home-Study Heating Course
Lesson No. 17

(Continued from Page 73)

velocity under a certain pressure is flowing therein; or the problem may involve these conditions but be expressed in a still different manner. Examples, solutions and problems follow that cover the usual forms in which they are met.

The flow of steam in pipes has been studied by different investigators, and formulae involving theoretical considerations, modified by coefficients obtained from experiments, have been presented.

(Next month's issue will contain the concluding section of Lesson No. 17)

New Bureau of Mines Bulletin on Burning Coke and Soft Coals in Heating Boilers

TECHNICAL Paper 367 just issued by the Bureau of Mines entitled "Value of Bituminous Coal and Coke for Generating Steam in Low-Pressure Cast-Iron Boiler," by C. E. Augustine, James Neil and William M. Myler, Jr., contains the results of a series of tests to obtain further information on the relative steaming values of coke and bituminous coals burned in a hand-fired low-pressure cast-iron boiler of a size suitable for heating large buildings. The method of firing approximated that which would be followed by firemen or janitors in office or apartment buildings or schools. Another purpose of the tests was to separate the heat losses in order to determine the effect of the method of firing and of structural changes in the boiler separately.

In these tests the firing charge was about 150 lbs. so that the firing period was varied to suit the rate of steaming. Furnace conditions were regulated by adjusting air admission in an endeavor to burn the coal with low heat losses. High excess air and unburnt combustible in the flue gases were avoided, as was also smoke production.

Bituminous coal and coke were used and it was found that at low ratings the bituminous coals and coke were of about equal steaming value; at medium and higher ratings the coals evaporated more water than the coke. At the higher ratings the coke had a steaming value of 90% of that of the bituminous coals at those ratings. When burnt at a low rating, the overall efficiency of coke was about 76%, but at the higher rating this dropped to about 66%, which was lower than that of the bituminous coals for which the thermol efficiencies ranged from 65% to 74% and showed considerable variation at the high ratings.

The other factors being unchanged, the nearer to the fire bed the secondary air is supplied and the more thoroughly it is mixed with the rising combustible gases, the sooner the combustion will be completed and the larger the proportion of heat absorbed by the heating surfaces from the products of combustion.

Cathedral Heating Plant Built for Durability

THE builders of the Cathedral of St. John the Divine are installing interior pipes and conduits on the same permanent and massive plan as the solid masonry which surrounds them. The architects and engineers have gone to extraordinary pains and expense to design pipes and fittings which will last indefinitely.

The Rev. Caleb R. Stetson, D.D., rector of Trinity Parish, who is chairman of the Committee on Fabric of the Cathedral Board of Trustees, in describing the piping work being done on the cathedral nave, stated:

"In planning the system of heating, the engineers are taking into consideration the probability that within fifty years this will be done by electricity. I think that undoubtedly such a system will become general within that time.

"The architects have attempted to devise an electrical distributing system that will give unusual durability and flexibility. The duct system is so arranged that at any time wiring can be installed for any conceivable service without disturbing or defacing the masonry. The main conduits are of fibre, 3 in. in diameter, of Orangeburg manufacture, and with special joints.

"To avoid the clogging of the drain pipes by freezing, a melting device will be built at the gutter opening, so that live steam can be turned on to melt the ice and snow.

Copper and brass were considered for the steam piping, but were discarded in favor of wrought iron because of the considerable expansion which the piping must stand. Furthermore, it was desired to weld all of the joints in order to avoid fittings, and pipes of copper are weak at the edges of the weld.

"The steam pipes are of double, extra strong, wrought-iron pipe, $\frac{5}{8}$ in. thick, with an interior diameter of $2\frac{1}{2}$ to 3 in. The steam pipes are covered with pitch, then with a thick covering of 85% magnesia, and then with two thicknesses of two-ply asphaltic roofing, wired on. In so far as possible, provision has been made for the removal and replacement of this piping.

"Between 80% and 90% of the heat for the nave is from the radiators in the basement, and these are readily accessible. The steam piping mentioned is to supply the few radiators under the windows and at higher points in the nave. Probably by the time these pipes have worn out other forms of heating will have been devised.

"The work I have described is very expensive but a Cathedral which is to stand a thousand years or even two thousand should be built solidly throughout."

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NOTHING in recent years has so caught the imagination of the heating industry as the announcement, from several sources, of a heating unit intended to replace the time-honored cast-iron direct radiator. The picture it presents is in happy contrast to that presented in the ventilating field by the open-window advocates. Coming down from the clouds of speculation as to the relative merits of mechanical and open-window ventilation, we have here a concrete and practical proposal which easily may have a profound influence in the design and installation of steam and water heating systems.

When one comes to think of it, it is astonishing how long the standard cast-iron direct radiator has held its sway. It never was a handsome object, although its unattractive characteristics came pretty near to being neutralized, thanks to the increased attention paid in recent years to improvements and even refinements in its design. But at best it comes in the category of necessary evils and has been tolerated, rather than sought after; its usual place before the window is always the choice location for other articles of furniture.

It is now realized that there was a special significance in the recent statements, proceeding from authoritative sources, that the direct radiator, in the nature of things, could not be expected to give the best results in homes, especially in providing uniform temperatures at different levels in the room. Carefully-compiled test figures were quoted to show that, under ordinary conditions, with direct radiators, the difference between the floor and ceiling temperatures was out of all proportion and that the common arrangement of direct radiators in a room represented a distinct waste of energy. As was shown conclusively, this condition is due primarily to the vertical currents of air produced by a direct radiator, whereas the desired condition is a horizontal flow of warm air out into the room.

IT was at this interesting juncture that the first announcement appeared of a unit providing for a lateral air flow, whose adoption is advocated under the slogan of "No More Radiators!" The new unit, consisting of a heat cabinet with a heating surface of copper, will be recognized as a modification of the existing types of radiator cabinets, but with the vital difference as to size and control of heat emission. In addition, there is the item of weight, which is given as one-tenth that of equivalent cast-iron surface.

Almost at the same time came the announcement of the "invisible radiator," which is equally unique in its use of copper and an aluminum alloy, making possible its comparatively small size. It also provides for a lateral warm-air flow. Possibly before these words are printed the industry will hear of still another type of unit for use as a substitute for the direct radiator, with the point of heat emission at the baseboard and at an angle to the vertical.

"I envy you," said a fellow publisher to the writer, recently. "You have more new things coming up in your field in a month than we have in a year." It is true, and the fine part of it is that the new things which are developing so fast are all contributing very definitely to our greater comfort and health.

THOSE who have been clamoring for some "practical" achievements on the part of the A.S.H. & V.E. Laboratory will find something to satisfy their demands in the work the Laboratory has just completed in connection with the question of eliminating the steam-type radiator. Here is a matter which has vexed the industry for years. Many people thought the water-type radiator could be used interchangeably, but nobody seemed to know. The question was put up to the Research Laboratory, the necessary tests were made and lo, all our doubts disappear because now we know. In this connection it would be ungracious not to assign a portion of the credit for this achievement to the American Radiator Company and to the Kewanee Boiler Company, whose recent tests furnished the desired confirmation, from a commercial point of view, of the Laboratory results. The net outcome is a simplification of practice and, in all probability, a corresponding reduction in costs.

Oil Burning Establishes Its Position in the Heating Industry

Third Annual Convention and Exposition a Convincing Proof That Domestic Oil Burning Has Earned Its Place as an American Industry

THE third annual convention and exposition of the American Oil Burner Association, held at the Book-Cadillac Hotel, Detroit, April 6-7-8, was notable from any point of view that might be taken as a criterion.

The exhibits of oil burners and accessories, originally planned to occupy one hall, were so numerous that, long before the convention opened, it was found necessary to arrange for a second exhibition room practically equal in floor space to that originally secured. Nearly a hundred manufacturers were represented of whom approximately one-third are engaged in the manufacture of oil burners. From the standpoint of oil burners shown, this year's display was as far ahead of the exhibition in Chicago last year as the present-day automobile show is ahead of its predecessor of ten years ago.

In the matter of personal attendance and interest, the show was also an unqualified and unlooked-for success. Nearly 900 were registered as being specifically interested in the manufacture or sale of oil burners or oil-burning accessories, in addition to which over a thousand visitors entered the halls during the three days.

That the convention was not in any way sectional was evidenced from the fact that visitors were registered from the Pacific Coast, the New England States, Canada, and as far south as Tampa, Fla. Three west-coast manufacturers were participants, two of them on an elaborate scale, and New England was well represented by manufacturers as well as by those interested more particularly in the sales end.

As a matter of fact, the outstanding feature of the convention was probably the meeting on a common ground of many of the leading spirits in the oil-burner industry, who had never before made personal contact. Some of the incidents arising from the gathering were indicative of the chief value of such a convention, the bringing together of nominally rival manufacturers, who discovered, in their competitors, persons of charm, breadth of mind and technical and business ability of a high order. The evident spirit of co-operation, and determination to work in close harmony toward a common end, characterized this convention as a marked change over conditions that existed a year ago at Chicago.

Lionel L. Jacobs
President of American Oil Burner Association

MR. JACOBS came to this country from England in 1910. His early training included a high school course, followed by a three-year course in chemistry at the City of London School and a two-year course at Swanley College. In 1910 he was sent to Canada to erect a tar-distilling plant for the Dominion Tar and Chemical Company and he was manager for that company until 1914.

In 1915 he built and put in operation a benzol-recovery plant for the Algoma Steel Corporation, was superintendent of the coke plant from 1915 to 1917, and purchasing agent for the Algoma Steel Corporation from 1917 to 1920. In that year Mr. Jacobs opened the Montreal branch of the Fess Oil Burners of Canada, Limited, and was in charge of the branch from 1920 to 1923. He has been in full charge of the operations of this company from that time to the present.

His experience in oil burning started in the tar plant in 1911. Particularly in the industrial field, his work has been fairly varied, covering the burning of oil, tar and pitch. It was not until 1920 that he did any work in connection with the domestic oil-burner field, but from that time to the present his activities in this connection have been fairly intensive and have covered the complete development of manual-control equipment to the fully-automatic equipment of the present day.

The scope of the papers presented at the three sessions of the convention included many of the vital phases of the oil-burner industry, and of the oil fuel industry upon which it so depends, but it would appear unfortunate that the program did not include contributions from representative engineers in the heating industry, so that the essential close relationship between the two might be more clearly brought out.

Indicative of the increasing importance of national sales-organizations and advertising campaigns, an appropriate portion of the program was devoted to consideration of these matters and the plan of the American Oil Burner Association for an advertising campaign was presented and thoroughly discussed. Approval of this campaign, involving the expenditure of substantially $70,000, was given by the board of directors.

FORMATION OF OIL-BURNER DEALERS' AUXILIARY DIVISION

Outstanding in the official business of the association, as transacted by the board of directors, was the adoption of a new constitution providing for an auxiliary division composed of oil-burner dealers. Provision was made for fifteen directors, three of whom will be elected by the dealers from the members of their division. It was also determined to incorporate the association under the laws of the State of New York. The board decided to hold a meeting at Toronto in July, at which time the time and place for the next convention will be determined. By action of the board, Wallace C. Capen of St. Louis, first president of the association, was made an honorary member. The board also determined upon a solid gold Aladdin's lamp as an emblem to be presented at each annual convention to the retiring president, and initiated this custom by the presentation of three such tokens to the first three presidents of the association.

The result of the election of officers for the coming year was as follows:

President:

Lionel L. Jacobs, Fess Oil Burners of Canada, Ltd.

Vice-Presidents:

Edwin M. Fleischmann, May Oil Burner Corporation.

John P. Leask, Peabody Engineering Corporation.

J. L. L. McCormack, Hardinge Brothers, Inc.

J. C. Johnson, S. T. Johnson Company.

R. S. Bohn, Preferred Utilities Company.

Directors:

Geo. P. Kittel, Aeroil Burner Company.
Edward P. Bailey, National Airoil Burner Company.
J. E. Martin, W. B. Wilde Company.
W. F. Tant, Silent Automatic Corp.
C. H. Chalmers, Chalmers Oil Burner Company.
C. A. Orr, Baker Oil Burner Company.
Fred C. Staples, S. T. Johnson Company.
W. Schwan, Gillespie & Schwan, Inc.
Leod D. Becker, American Oil Burner Association.

An earnest endeavor was made by manufacturers to have their exhibits in place Monday night and so uniformly successful were they, that when the exhibit halls were officially opened at 9 o'clock on Tuesday morning, practically every exhibit was in place and very little confusion resulted. The unexpected number desiring to register on Tuesday morning packed to the utmost the facilities available and caused some delay in opening the convention proper.

Afternoon Session, April 6

Following brief but pertinent remarks by the president for the past year, C. H. Chalmers of Minneapolis, Leod D. Becker, executive secretary of the association, outlined the activities of the association during the past year and using the present status of the oil-burner industry as a basis, predicted a bright and profitable future for those engaged in the manufacture and sale of oil-burning equipment and accessories. Speaking on "Our Petroleum Resources," R. C. Welch, general counsel of the American Petroleum Institute, trampled upon the bogey of future oil supply in a way that convinced his hearers that this question need not be considered a factor in sales resistance by manufacturers, nor, by a prospective purchaser as a reason for not purchasing a burner.

C. F. Olmstead, technologist of the association, spoke on "The Road to Progress and Profit in the Industry," outlining the channels through which probable oil-burner developments would take place, and methods and policies that should be adhered to in order to return profit commensurate with the undertaking. Following a brief discussion of some of the points raised by the speakers, the meeting adjourned in order that the annual business meeting, open to members only, might be held. This meeting resulted in the election of officers for the ensuing year and afforded an opportunity for the discussion of important matters relating to the work of the association.

During Tuesday evening, the exhibit halls were opened for the benefit of architects, building contractors, engineers, executives and a specially-invited list of Detroit home-owners. The fact that practically every invitation was accepted indicated a keen interest on the part of the public.

Morning Session, April 7

The Wednesday morning session was initiated with an address by Andrew H. Melville, director of research, Condé Nast Publications, Inc., on "Sales Ammunition." This talk was in the nature of a report on statistics on oil burning collected by Mr. Melville, and utilized for a determination of advertising and sales campaigns. The paper formed a sort of introduction to a second contribution on the same subject, "How Associations Have Increased Sales Through Co-operative Advertising" by J. J. O'Donnell, sales manager of the William Green Corporation, New York.

This, in turn, led to the presentation by Leod D. Becker, executive secretary, of the association's plan for selling the idea of oil burning to the American public. It was in order to prepare a foundation of facts, upon which an advertising plan might be erected, that the William Green Corporation undertook to make an analysis of the present status of the oil-burning industry and of its possible lines of development. The main point brought out by Mr. O'Donnell was the fact that the established heating industry is, largely through lack of education, still skeptical as to the possible advantages of oil as a fuel for home use. The plan of advertising, as formulated by the association, involves the use of approximately $70,000 during the coming year, to be largely expended in the production and distribution of booklets and similar material, for distribution to selected mailing lists. A comparatively small proportion of the total fund will be used for trade paper, engineering magazine and popular magazine advertising.

There was also presented during this session, a paper on "The Place of Oil Burning in Industry" by Dr. Howard C. Parkelee, editor-in-chief of *Chemical and Metallurgical Engineering*. This paper covered in a very thorough and systematic way the present uses and possibilities of oil-burning as applied to industrial applications, principally those in the chemical and metallurgical field. These uses of oil for heating involve distinctly different considerations from those obtaining in house-heating or commercial-heating installations and, from the data presented in this paper, it would appear that oil-burning in the industries under consideration was of sufficient importance to justify its consideration as a separate and distinct phase of the oil-burning industry.

Afternoon Session, April 7

Opening the afternoon session, M. E. Simpson, general manager of the Northern Machinery Company, which manufactures a highly-developed atmospheric burner, spoke on "The Natural Draft Burner—Its Place in the Industry." Mr. Simpson pointed out the fact that the natural-draft or atmospheric burner was in many instances derided by those engaged in the manufacture or sales of mechanical-draft burners as being worth no consideration by the industry.

Mr. Simpson pointed out the almost self-evident fact that many home-owners cannot pay the price for a power burner and that many American homes are prevented from using power burners because electricity and gas are not available. In these homes, there is certainly a market for atmospheric burners that does not in any way intrude upon, or conflict with, the possible sale of mechanical-draft burners. The question then becomes one of producing atmospheric-draft burners that can offer to the purchaser the same relative degree of satisfaction as is secured from the use of the typical high-class power burner.

Many thousands of atmospheric burners have been sold, and while some have admittedly been of cheap construction, and incapable of maintaining high combustion efficiency under varying conditions of drafts, yet developments during the past year have been such that several atmospheric burners are now available, capable of providing closely regulated heat, and with a high degree of stability of operation under varying draft conditions.

James L. Breese, Jr., of Chicago, also an advocate of the atmospheric-draft burner, spoke in commendation of the points brought out by Mr. Simpson. Mr. Breese, who is well-known for his exhaustive and original research work on various phases of oil combustion, is of the opinion that the time is not far distant when the atmospheric burner will occupy a position in the industry respected alike by the consumer and by the manufacturer of mechanical-draft burners.

"Building the Dealer Sales Organization and Getting Sales Volume" was the subject of a paper by Charles Van Maanen, secretary of the Oil Burning Engineering Company, of Detroit. Mr. Van Maanen discussed a method of making a market analysis in any locality, which analysis should form the basis of the goal to which any oil-burner sales organization in that territory may strive. With this target set up, it becomes possible to set a quota of sales for that territory, and it is in reaching or surpassing this quota that the calibre of a sales organization is determined.

In a paper entitled "Manufacturers and Dealers—Friends or Foes," by M. J. Binkley, vice-president of the Caloroil Burner Corporation, New York, the relationship was outlined that should exist between manufacturers and the channel through which their products are ultimately sold. This situation is one of the utmost importance, as it involves, in many cases, the entire problem of disposing of the product by a manufacturer. By maintaining the proper

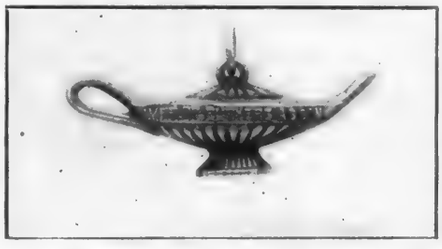
relationship with the dealer organization, almost any reasonable result may be attained, but, on the other hand, if careful consideration is not given to mutual rights and to unqualified cooperation, the relationship will not prove pleasant or profitable.

"The Significance and Trend of Oil Fuel Specifications," by W. H. Camp, general superintendent, Empire Refineries, Tulsa, Okla., and "Oil Deliveries and the Possibilities of a Central Service Depot," by William A. Cahill, of the Cahill Oil Company, presented two phases of no small importance to oil-burner manufacturers. As a matter of fact, the securing of oil of uniform characteristics, preferably with definite specifications to meet the requirements of any burner, has been one of the problems of the industry since its beginning.

ORGANIZATION OF DEALER DIVISION

The concluding business of this session involved the organization of a dealer division of the association. Both the necessity and the advisability of having oil-burner dealers as auxiliary members of the association having been apparent, an invitation had been extended to distributors and dealers to come together at this time for the purpose of forming such a division.

The initial meeting called for the purpose of forming a Dealers' Division of the American Oil Burner Association convened with E. P. Bailey in the chair. He explained that in revising the constitution of the association to permit the formation of a dealers' division, provision was made for the addition of one vice-president and two other directors to the parent association. These will be elected by the dealers' division to represent it. With over forty dealers present Oliver Ward, Rutland, Vt., was selected as temporary chairman and took charge of the meeting. There were then elected as directors to represent the Dealers' Division in the American Oil Burner Association: R. S. Bohn, Preferred Utilities Corp., New York;



Aladdin's Lamp Emblem, Presented to Each Past President

W. Schwan, Gillespie & Schwan, Dallas, Texas; and Fred D. Staples, S. T. Johnson Co., Chicago. Mr. Bohn was designated to serve also as a vice-president of the American Oil Burner Association.

Those present then elected the following to constitute a board of governors of the dealers' division: Oliver Ward, chairman, Rutland, Vt.; J. F. Siegel, Fuel Oil Engineering Co., New York City; George W. Neal, Tampa, Fla.; W. F. Schroeder, Schroeder & Curry, Inc., St. Louis; Ray F. Porter, Belden, Porter Co., Minneapolis; J. W. Martell, Hy-Lo Oil Burner Co., Kankakee, Ill.; J. H. Woolson, Johnson Oil Burner Co., Toronto, Ont. These with the three directors will constitute the Board of Governors.

After some discussion, it was decided that the initiation fee should be $15.00 and annual dues, $25.00, and after appointing a committee to draw up by-laws to be presented at the next meeting, and settling upon a membership of a thousand to be the mark before the next annual meeting, the meeting was adjourned.

On Wednesday evening, the annual banquet of the association was held in the Crystal ballroom. At the conclusion of the dinner, which was enlivened by impromptu mass singing, and by individual and group vocal contributions by members of the association, the address of the evening was made by Edward P. Bailey, past president, who chose as his subject "The Constitution Among Friends." Mr. Bailey developed an interesting historical narrative of the formulation of the constitution of the United States, and drew a parallel in the original preparation of the constitution of the American Oil Burner Association, and of its revision at this meeting.

The keynote of his address was the solidarity of the industry as evidenced by the presentation and adoption, in less than an hour, of a revised constitution, whereas the initial document under which the association had been organized required weeks of struggle before a unanimous acceptance vote was secured. The welding-together of the members of the association during the three years of its existence, and the mutual respect and confidence of the

Convention Dinner of American Oil Burner Association, Book-Cadillac Hotel, Detroit, April 7, 1926

members one for another, was aptly brought out by the comparison.

Following this address, there were presented to the three past presidents, Wallace C. Capen of St. Louis, E. P. Bailey of Philadelphia, and C. H. Chalmers of Minneapolis, by the newly-elected president, Lionel L. Jacobs of Toronto, three gold tokens in the form of Aladdin's lamps. Each recipient responded briefly to the words of appreciation of services rendered. Following the presentation, the floor was cleared for dancing.

Morning Session, April 8

The concluding session of the convention was opened by a paper on "The Influence of Intermittent Firing on Efficiency," by James L. Breese, Jr., president of the Breese Engineering Corporation, Chicago.

Mr. Breese first brought out the point that until very recently, oil burner engineers were chiefly concerned as to how to secure reasonably complete combustion and to produce burners that would operate without constant service.

"We have," he said, "passed through a stage where the thrill of seeing our burner burn oil has lost its novelty and we are today experiencing a similar thrill when our burners operate for entire seasons without any service."

He predicted that the industry is now entering upon another stage of development, the chief aim of which is to provide for a more economical method of transferring the heat of combustion to the heating medium. The system of intermittent firing that is now practiced throughout the industry is largely the result of following lines of least resistance. Inasmuch as the outstanding problem in oil burner design has been to secure the proper proportion of oil, gas and air, it followed that from the first, the simplest method was used. This consisted of so arranging the burner that it would operate at maximum efficiency with accurately measured quantities of oil and air metered to the burner when heat was wanted, and when heat was not required, the burner was entirely turned off. This was obviously a much more simple matter than endeavoring to secure a proper ratio of oil and air throughout the complete range of the burner.

Mr. Breese brought out the point that the development of the domestic oil burner is following along channels very similar to those through which the internal combustion passed in its development. In the earlier days when gas and gasoline engines were used primarily as stationary units for the supply of power, the old-fashioned "hit-and-miss" governor was designed to provide for varying loads by the simple expedient of allowing either a full charge to enter the cylinder or of eliminating the charge altogether and allowing the cycle to be completed without a power stroke. This was a cheap and simple way of obtaining rough governing, but when the gas engine began to be used for automotive and similar purposes, the method was changed to quantitative governing, which provided for a constant ratio of air and fuel at all loads, the governor admitting variable quantities at each cycle as required.

Another parallel is the development of the gas hot-water heater for domestic use. The first heater developed for this purpose was the so-called "instantaneous" heater in which the burner was either all on or all off. Owing, however, to the first cost of installation and a relatively high cost of operation, this type of heater has given way to the so-called storage type which is now coming into general use. In this system, the water is continuously heated at a comparatively low rate and held in reserve for immediate use.

Mr. Breese drew the conclusion that history will repeat itself and that the ultimate burner will be one which is in continuous operation, its output being varied between high and low limits. In defining the present period in oil burner development, Mr. Breese made a statement of particular interest in view of the article "Does Loose Sales Talk Pay?" in the April issue of THE HEATING AND VENTILATING MAGAZINE. He said, in effect, that this stage is marked by burners materially different in design and construction operating to accomplish the same end. "The claims," he said, "made by each manufacturer are usually those advanced by advertising experts who, without engineering knowledge, gather together engineering terms which they hear around the shop and mould them together, parrot-like, in an attempt to prove that the principle of the burner they are merchandising is the only successful one, and that others, therefore, operate on incorrect principles."

Mr. Breese again referred to the automotive industry, citing the cases of many manufacturers who buy parts from the same specializing maker, assembling these parts with very little to indicate a difference between the cars except a distinctive radiator.

Mr. Breese then defined the function of an oil burner as having the ability to keep the rate of molecular vibration in a house constant, supplying energy to the house at the same rate at which it is dissipated into the surrounding atmosphere. He then pointed out that the modern conventional boiler designed for coal, into which the present-day oil burner must be installed, was so designed as to burn coal at a specified rate of so many pounds per hour. Reference to the efficiency load of any of the coal-burning boilers will show that the efficiency of the boiler and grate is least at the two ends of the load and highest at intermediate points, usually about 30% of the rated capacity of the boiler. The reasons for this characteristic are evident when one considers that operating at low load, the combustion efficiency is decreased on account of the many air leaks through cracks in the doors, ash-pit opening, etcetera, resulting in considerable excess air being inadvertently supplied to the fire; at the opposite end, the efficiency is low because the absorption rate of a boiler is not able to meet the high heat production rate when the boiler is forced.

Drawing a parallel, he found that in the operation of the present-day intermittent oil burner, when the burner is off, all the air passing through the boiler is excess air and as heat escapes from the stack without any being produced, there is actually a negative efficiency over this period. Then, when the burner is on, if it is adjusted to provide full load when burning continuously, it is obviously burning at the inefficient point on the high end of the boiler efficiency curve. If, now, a theoretical source of heat be assumed that would be controlled by a thermostat and would supply to the house the exact amount during each minute that the house required during that period, such a burner would obviously be of the highest possible efficiency. Mr. Breese then pointed out that the principal reason for the high annual efficiency of the oil burner lay in the fact that in the spring and fall, when there was no demand on the boiler, the burner remained inoperative and no fuel was uselessly burned as in the case with coal. For this reason, and because this condition exists during about three months of the heating season, oil heating frequently proved less expensive than coal, even when the cost of oil is higher per B.T.U. than is coal.

Mr. Breese then stated that it was his belief that an oil burner could be designed that would operate at all times and would have a variable range, sufficient to meet the requirements and also contain the necessary mechanism to turn it off and on during the extreme months of the heating season. He cited tests recently made at the Armour Institute of Technology on a continuously operating burner proving conclusively that during the time heat was required, this burner showed an efficiency at least 10% more than that secured with an intermittently operating burner and that under conditions of extremely accurate control of air, the efficiencies were from 12% to 13% better.

Efficiency, however, is not the entire criterion of usefulness or desirability and Mr. Breese does not believe that an oil burner would prove satisfactory with a motor running continuously. He then quoted from standard draft tables to show that there is more draft available in the average residence than could be possibly used to burn oil efficiently during the coldest weather, provided a burner is designed to operate at velocities considerably less than those now in common use.

Mr. Breese concluded his paper by stating that it was his opinion that the next few years would produce burners minus motors, blowers, pumps, atomizers and other complicated mechanisms

and that the popular burner would be a gasifying device, capable of handling combustion at much lower velocity than is now standard practice with mechanical draft burner.

"The time will come," said Mr. Breese, "when manufacturers of boilers and furnaces will provide heating plants which will burn oil by natural draft in substantially the same way that they now burn solid fuel, with the higher annual efficiency that may be secured through the combustion of liquid fuel."

By special invitation, F. M. Feiker of the Society for Electrical Development brought to the attention of the association the possibility for co-operation between the oil burner industry and those engaged in the upbuilding of the electrical industry.

"What Is the Use of Oil Burners," by Carl L. Flink, Institute of Thermal Research, the American Radiator Company, Buffalo, was one of the most important contributions to the convention from an engineering standpoint.

Mr. Flink has evidently been approached times without end for his opinion regarding one burner or another, for he designated the first question usually asked as "What do you think of the —— oil burner?" He then suggested that the question might be asked in another way: "Is the —— burner a successful one as viewed by the user?" This leads to a study of what oil burners should do in practice, in other words, what is expected of the burner.

Oil burners are now generally installed in boilers designed for use with coal, and until a sufficient demand for special oil-burning boilers has been created to permit their production on a reasonably large scale, Mr. Flink believes that such boilers will not be offered by the larger manufacturers. Again, the public will not be entirely sold on oil burning until there is some reasonable ground for believing that oil will be available for many years to come. The natural scepticism of the day is intensified by reports of increasing oil shortage, and of new cracking schemes, so that many are fearful that the price of oil fuel for domestic use will rise until it will become a luxury.

Mr. Flink stated his belief that a boiler designed for use with an oil burner would show a better efficiency than one designed for solid fuel, and would be the ideal thing for the burner manufacturer and home owner alike, but held that practical considerations governing the situation demanded that the burner designed to be sold in large quantities should be adaptable to either the special oil-burning boiler or to the conventional coal-burning boiler.

"In picking out a coal-burning boiler," said Mr. Flink, "it has, for many years, been customary to select a boiler with a rating from 70% to 125% greater than the determined equivalent direct radiation load. This excess has been called the "safety factor," and is not applied because of the inability of the boiler to operate at or above the manufacturer's rating." An understanding of how coal burning boilers actually perform on the job leads to a more intelligent selection of a burner for any given oil-burner job, so that this operation should be studied in detail."

The greatest load that a boiler is called upon to carry is made up of five items; (1) the equivalent direct radiation load, which is the total computed heat output of the radiation in B.T.U. divided by 240 B.T.U.; (2) the piping loss, which is the B.T.U. output of the piping when the system is full of steam; (3) the heat necessary to bring the iron in the heating system up to the temperature of the steam; (it is assumed that this iron is at the same temperature as the room when the boiler begins to function; (4) the heat required to bring the water in the system up to the steam temperature; (5) the heat necessary to make up for the increased heat output of the system when the room temperature is below that required.

The aggregate of the first two items may be termed the operating maximum load, while the sum of all five may be called the instantaneous maximum demand. It is obvious that a boiler with maximum capacity equal to items 1 and 2 could carry the load successfully only if the piping, radiators and room were not permitted to cool down, and if the weather conditions did not impose any greater load.

The other three items must be given careful consideration in selecting a boiler that is required to operate with an intermittent fire. The time allowed for warming up a system determines the load due to these last items, and, from observations of coal-fired boilers in operation it is evident that the load called for by the last three items is about equal to the sum of the first two. If the piping load is assumed as 25% of the direct radiation load, the total possible load that may be imposed on any boiler, due to the five items above enumerated, will be twice 125% of the direct radiation load, or 250% of it. If, then, the boiler is chosen with a rating 100% in excess of the net direct radiation, it will still have to operate at 25% greater output than its rating, in order to meet the maximum load that may be imposed upon it. Mr. Flink states that, in his experience, any good boiler will deliver this overload of 25% when it is operating with a clean fuel bed, is attached to a proper chimney, and has all dampers wide open. Even continuous operation up to 50% in excess of rating is not beyond the capacity of a good boiler.

Fig. 1 is a sketch of a curve shown by Mr. Flink, illustrating the output of a heating boiler under drive test, during which the boiler operated at an average of 145% of rating during the entire test. The curve shows that, less than an hour after firing, the boiler was delivering 125% of its rating, and that it could carry an average overload of 45% indefinitely, if properly fired. As boilers are required to operate at these overloads when warming up a cold

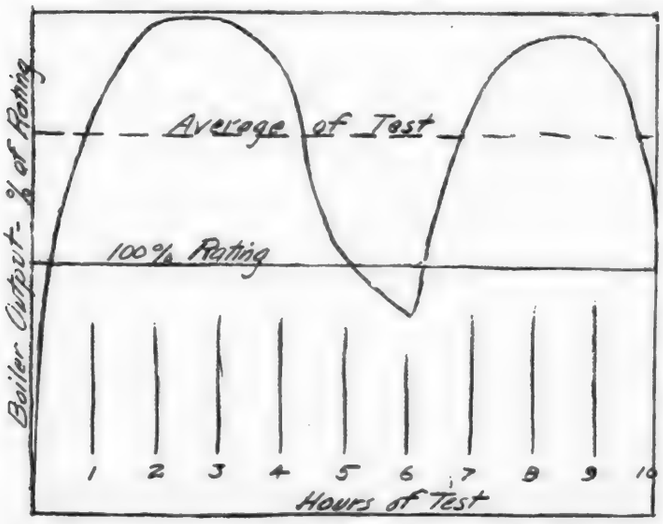


Fig. 1. Output Curve of Heating Boiler During Drive Test

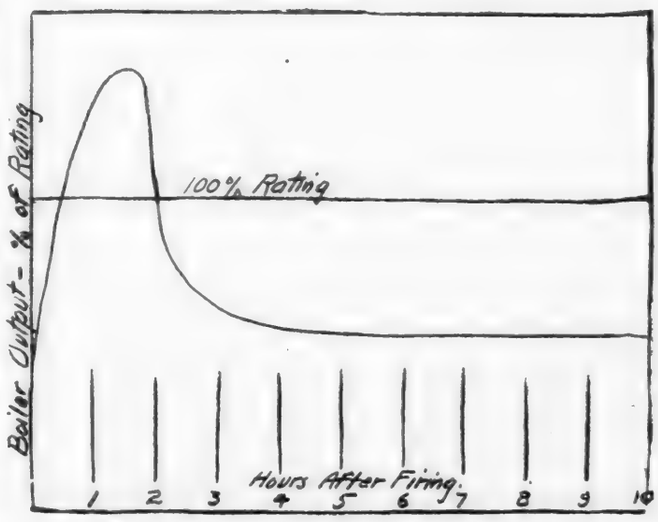


Fig. 2. Output Curve of Heating Boiler During Cold Day

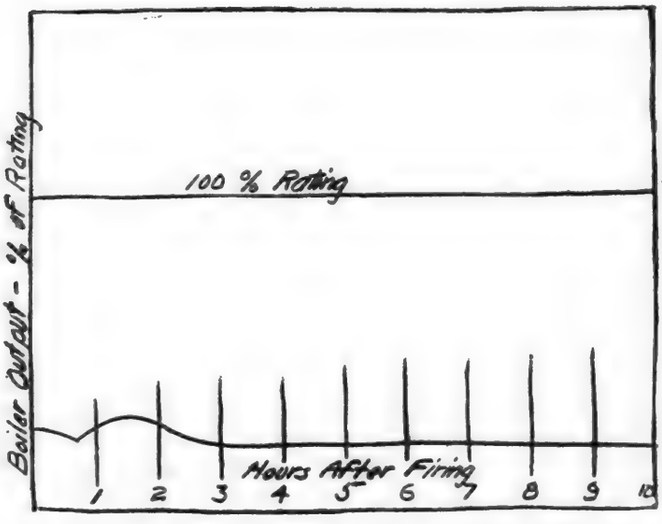


Fig. 3. Output Curve of Heating Boiler During Mild Day (Fire in Good Condition and System Warm at Start)

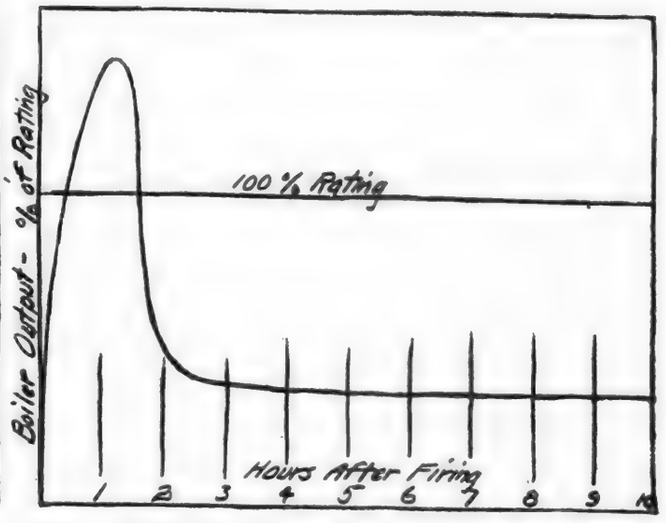


Fig. 4. Output Curve of Heating Boiler During Mild Day. (New Fire. System Cold at Start.)

house, it is evident that the time necessary to bring a cold house up to desired temperature depends upon this overload capacity. Mr. Flink stated that it might be as high as 185% of rating.

"The average output for an entire heating season," said Mr. Flink, "is only about 30% to 40% of boiler rating, and since it has been shown that operating at overloads as high as 180% may be provided for during warming-up periods, it is evident that much of the operation must be at loads below 30% rating."

A curve (Fig. 2) was then shown representing typical performance during a cold day, of a boiler rated at 100% in excess of the attached direct radiation load. Fig. 3 shows a daily output on a warm day, if the fire is in good shape in the morning, and Fig. 4 tells the story if a new fire has to be built after the building has cooled during the night. These curves picture the average operation of coal-fired boilers.

Mr. Flink then turned to a consideration of oil-fired boilers, which, obviously, are not required to operate at such extreme output rates. He found that it is possible to obtain greater drive outputs with a boiler oil-fired than when using coal, and pointed out that the efficiency of the burner itself might vary over wide limits without affecting the boiler ability. It was simply a question of the ability of the burner to develop the required amount of heat, regardless of the efficiency of its combustion. He then cited a case where, in a drive test with coal, the boiler developed 140% in excess of its rating over a 6 hour period, and 170% over rating for one hour. Two oil burners of different types were installed; with one the boiler developed 198% excess and with the other 235% excess over rating. In comparing the abilities of the boiler with the two fuels, Mr. Flink called attention to the fact that the comparison should be made on the basis of 140% excess ability with coal and 235% excess with oil, as these figures represent abilities for continuous operation in either case.

It is evident, from a study of these factors that, with an intermittent type of oil burner, the burner would probably be set to furnish heat at about 75% of the rating of the boiler.

If a boiler is selected with a rating 100% above the equivalent direct radiation load, with 25% loss for piping, the boiler will have an output, at 75% of its rating, equal to 20% above the equivalent direct radiation load plus the piping loss, which will be available for pick-up of load. This is found to be satisfactory under nearly all conditions. However, as practically all oil burners are operated with thermostatic control, allowing the house temperature to drop only two or three degrees, the burner may, with such control, be set at about 50% of the boiler rating to work with satisfaction. The burner should be adjusted to the lowest output possible to maintain the required load, because of the fact that boilers usually operate at higher efficiencies on the lower parts of their curves rather than the upper parts. It follows that the use of thermostatic control permits the burner and the boiler to be operated at the highest possible mutual efficiencies.

Mr. Flink then concluded, as the result of this analysis, that an oil burner should be set to develop between 50% and 100% of the boiler rating, depending upon the load to be carried. With these data, he then outlined his ideas of what a successful oil burner should be capable of doing.

It should be capable of adjustment between 50% and 100% of the rating of the boiler which it is intended to fire; it should be safe; it should not require more attention than set down by the manufacturer; it should burn the fuels specified by the manufacturer; it should produce efficient combustion in any boiler to which it is suited.

Mr. Flink is a firm believer in the efficacy of laboratory tests, stating that, with conditions under control, more could be learned regarding the behavior of a mechanism in a short space of time than could be discovered in years of field performance.

The following items were enumerated as constituting a basis for a laboratory test of an oil burner; they should be determined before a test is started:

(1) Is the burner a finished or an experimental job?

(2) To what types of boilers is it suited?

(3) What is its range of capacity?

(4) What is the proper method of installing it?

(5) How sensitive is the burner to air leakage through fire-door, etc.?

(6) To what range of oils is the burner adapted? What oil is preferred?

(7) How long should the tests be?

(8) What attention is permissible during test runs? What adjustments are permissible during test runs?

(9) What are the chimney requirements?

(10) What safety features are embodied in the burner? How should the safety of the burner be determined?

When tests have been run on a burner, it should be possible to answer the following questions:

(1) Will the boiler develop catalog rating with the burner?

(2) What efficiency can the burner show?

(3) Is the burner efficient at all rates within its range?

(4) What kinds of oil will the burner burn? Is it equally efficient with all?

(5) Were adjustments necessary during test?

(6) Were air adjustments easy to make? Can the average home-owner make such adjustments, or must they be made by a service man?

(7) What is necessary to adapt the burner to different boilers for which it is suited?

(8) What is the appearance of the flame for best combustion?

(9) Is secondary air under the control of the burner? What are the effects of such air leaks as might develop?

(10) What is the principle of operation?

(11) What are the safeguards against trouble?

(12) What noise is made by the burner, as related to some standard?

(13) If carbon should form in operation, can it be easily seen and removed?

C. W. Fletcher, president of the Tite-Flex Metal Hose Company, read a paper on "Metal Hose and Its Place in Oil-Burning Equipment" in which he pictured the problem of the oil-burner manufacturer who desired to convey oil or gas, or both to his burner in such a manner that the burner unit might easily be displaced from the boiler for purposes of inspection, cleaning or for the emergency use of the boiler with solid fuel. This problem is answered by the use of flexible hose which must, of course, meet very rigid requirements on the part of the underwriters, as well as the manufacturers. The solution of many of the interesting problems that came up in connection with the working out of such a product was portrayed by Mr. Fletcher.

Lionel L. Jacobs, vice-president of Fess Oil Burners of Canada, Ltd., and newly-elected president of the association, concluded the convention program with brief observation on "High Points of This Convention."

"Detroit Night" at the Convention

Tuesday evening was known as "Detroit night," the Oil Burner Association of Michigan, acting as host at a frolic and dance in the Crystal ballroom, to which all guests, especially the wives and families of attending delegates, were invited. Apprehending a shortage of dancing partners, the association very thoughtfully secured these by inviting over a hundred of Detroit's fairest to the dance. The affair was informal, and, interspersed with novelty solo dances, provided by members of the Michigan association, impromptu Charleston contests were held. Preceding the dance, Edward P. Bailey, a past president of the association, broadcasted through station WJR, located in the Book-Cadillac Hotel, an address on oil burning.

Heat Losses in Poorly Built Houses

According to figures compiled by the Better Building Registry, heat losses in the average poorly-built home, over a period of twenty years, amount to more than $4500.00 On this basis, flimsy construction, the absence of insulating material and weather stripping, failure to cover steam or furnace pipes, loosely-built walls and defective chimney flues and heating plants cost the home owner, in a city like Chicago alone, more than $50,000,000 a year and in the nation as a whole, more than $450,000,000.

Past Developments in the Oil Burner Industry Reviewed and Future Improvements Forecast by Its Leaders

WITH so many of the prime movers of the oil-burner industry gathered together in Detroit, it seemed opportune to discover the consensus of opinion on vital questions. To this end the following comments were secured:

WHAT IS AHEAD

C. H. Chalmers, retiring president of the association, speaking of important developments that might be expected under his successor said:

"Progress for the next year in the domestic oil-burner industry will be along several lines. First, additional refinement of middle-class burners and listing of same (when so refined) by the Underwriters' Laboratories; second, labeling of individual burners made by the better-class builders, these labels to be furnished by the Underwriters' Laboratories; third, larger sales than ever before of good burners to a gradually enlightened public; fourth, the advent of the oil-gas burner, probably crude at first, but very interesting and suggestive as to its future."

ACCOMPLISHMENTS OF THE PAST YEAR

Lionel Jacobs, newly-elected president, in commenting upon what had been accomplished during the Chalmers regime, said:

"The 1926 convention is at its close and naturally one stops a moment to consider what has been accomplished since last convention.

"Much indeed—improvements in product, in control, in safety, beyond all expectations. The alliance of the dealers with the manufacturers in the national (I should say international) association for mutual help and progress. The remarkable investigation of every phase of the industry occupying nearly 12 months and the development therefor of a national educational campaign to be carried out at a cost lower than the advertising appropriation of one of the smaller national advertisers, are all accomplishments worthy of note, but I really believe that the most notable accomplishment of all and that making for most progress in the industry, is seen in the changed attitude of the individuals, one to another—the disappearance of the old suspicions and jealousies, permitting a common discussion of problems, a change produced by contact and a better understanding.

"It looks indeed as though the industry were at last getting on solid ground."

CO-OPERATING WITH THE HEATING INDUSTRY

Replying to the question: "In what ways can the oil-burner industry and the heating industry co-operate to the greatest mutual advantage?":

M. H. Braden, vice-president of The Nu-Way Corporation, Rock Island, Ill., said:

"By close co-operation in educating each industry to its respective limitations; with each industry helping to educate the distributor and dealer in the proper installation and service to which the public is entitled."

W. H. Fraser, director of sales, W. B. Wilde Company, Peoria, Illinois:

"If the heating men throughout the country would stop blaming oil burners for the inefficiency of heating systems that are equipped with oil burners, and would take more time to familiarize themselves with oil burning, many of the prejudices which they have had against this method of heating would be overcome."

RECENT DEVELOPMENTS

Answering the query: "What do you consider the most significant development in the oil-burner industry during the past year?":

H. W. Bonnell, sales manager, Combustion Fuel Oil Burner Company, Milwaukee, Wisconsin:

"For the year 1925 I think the development of better and more positive controls by manufacturers of that equipment has had much to do with the increased satisfaction derived by the purchasers of oil burners. So far as the oil burner itself is concerned, the general tendency to get away from the inside storage or service tank, and the provision whereby oil is taken directly from an outside storage tank, is the outstanding development in our industry. This feature alone helps to make oil burning safer, as it eliminates the necessity of storing oil in our homes."

P. L. Iddings, advertising manager, Wayne Tank and Pump Company, Fort Wayne, Indiana:

"Three things are outstanding in the oil-burner industry's development during the past year. First, definite refinement in the design and manufacture of completely automatic power burners; second, marked improvement in control and safety devices; third, gradual elimination of cheaply constructed and inefficient burners as manufactured by many 'fly-by-night' concerns. All of these developments are evidenced by the steady breakdown of consumer sales resistance and the increase in the value

of the oil-burner dealer franchise—the inevitable results of increased stability in one of the world's fastest growing industries."

A. P. Mudgett, manager of sales, The Honeywell Heating Specialties Company, Wabash, Indiana:

"I think the most pronounced development we have noticed during the past year in the oil burner industry has been in the desire of the burner manufacturer to fully acquaint his dealer organization with a precise and definite understanding of the burner.

"We have sensed a very definite trend on the part of the burner manufacturer to help his dealer organization understand the necessity for correct, careful, and workmanlike installations.

"We have seen a definite recognition of the possibilities and limitations of burning oil in existing heating plants.

"All of these factors point towards a sound basis for the further growth of the burner industry."

FUTURE DEVELOPMENTS

The seers, looking to the future, report as follows, on "What do you anticipate will be the most important development in the oil-burner industry during the coming year?"

E. M. Fleischmann, president, May Oil Burner Corporation, New York and Baltimore:

"The oil-burner industry during the past twelve months has made greater progress mechanically in the perfection of the equipment than in any previous twenty-four months. I anticipate that within the next twelve months this same stabilization will take place from the financial and merchandizing standpoint. More strong financial organizations are emerging from the cloud which has hovered over the oil-burner industry, and I think you will find that, at the end of the year, the entire industry will be looked upon by the public as having arrived."

G. Stanly Meikle, chief engineer, Silent Automatic Corporation, Detroit:

"Development is always inspired by necessity. There exists a need in every department of effort in the entire oil burner industry.

"It is my belief that in the coming year there will be no 'most important development.' The industry is too young and too insecurely founded, and too much basic information is yet to be secured through original research, to make any outstanding contribution probable.

"In the past year there has come an awakening to the possibilities in the oil burner field. Financially strong interests are being attracted and ways and means will be forthcoming for the securing of fundamental knowledge upon which the industry of the future will be more securely established.

"The oil burner of the future will be simple, durable, reliable and adaptable. The lack of adaptability has been one of the serious problems to the oil burner manufacturer. Contributions to our meager knowledge of the combustion of fuel oils will be the greatest stimulant to the industry in the immediate future."

C. H. Chalmers, general manager, Chalmers Oil Burner Company, Minneapolis:

"It seems to me that the year of 1926 will have no startling developments in the oil burner industry. 1925 and 1924 and so on back did not see any very outstanding development. The industry is gradually settling into a few well known types of burners and the development has been a slow process of refining these various types so as to secure for the public, safety, reliability, and reasonable efficiency.

"There are now over forty concerns building burners that are listed as standard by the Underwriters. During 1926 this number will be increased somewhat. I think it is becoming generally recognized that there are certain fundamental requirements for a good oil burner and that all the really successful burners on the market include fairly good solutions of these fundamental problems.

"I don't believe there is any place in the oil burner industry for the revolutionary inventor and I don't see anything in sight for the coming year, except the continued gradual refinement of the better class burners. This refinement will be exceedingly gradual because a number of burners have reached the point where they are so well adapted to their requirements that further improvement is well nigh impossible."

H. A. Kunitz, vice-president, Home Appliance Corporation, St. Louis:

"The most important development in the Oil Burner Industry in the next year will be the perfection of details and a tendency to burn heavier oils. The perfection of details is a necessity, as it will cut down service and by that enable the dealer to increase his profit. Utilization of the cheaper grades of oil necessarily will follow the growing scarcity of the lighter grades, due to large consumption. One additional important development is due—increased efficiency and education of the public about what constitutes good combustion and its application to the heating system."

James L. Breese, Jr., Breese Engineering Corporation, Chicago:

"The most striking condition I found at the recent oil-burner convention, was that more than half of the oil burners exhibited operated by natural draft. I believe that during the coming year, the manufacturers who are now selling natural draft burners, but utilizing mechanical gasification, will realize the great advertising value of natural draft, and will feature it in their appeal to the public. As soon as the public realizes that most burners are now operated by natural draft, they will be ready and eager to accept natural draft burners without mechanical gasification."

REFLECTIONS OF A PIONEER

Finally, appealing to one of the pioneers in the industry to jot down "What the old-timer thinks," we have, from **J. C. Johnson,** president, S. T. Johnson Company, Oakland, California:

"The recent convention very plainly indicated the rapid advance in the industry during the past twelve months.

"The character of the display of oil burning equipment, temperature control equipment and auxiliary devices intended for modern heating plants and suitable for installation in homes, commercial and industrial plants of all sizes and descriptions up to the heating of a modern sky-scraper, were shown, illustrated and demonstrated by oil-burner manufacturers and auxiliary manufacturers to the largest assembly of oil-burner dealers and distributors that have ever gotten together at any one place.

"The business meetings of the association were unusually successful and besides the election of the new officers of the association, the formation of a dealer's division was a very important step which will, without doubt, increase the dealer's interest and in so doing increase the membership of the association, the attendance at the annual conventions and result in a closer relationship between the dealer and the manufacturer of oil-burning equipment. There is no doubt but that this better relationship and closer working out of the details of the business, keeping the installations in harmony with the manufacturers' intentions, will be a great stride forward, and a benefit to the public generally."

Detroit Free Press's Oil-Burner Supplement

An example of the progressiveness of one newspaper, *The Detroit Free Press*, was found in a special oil-burner convention supplement issued Monday, April 5, the day before the opening of the convention. This section consisted of a 24-page supplement, containing, in addition to considerable oil-burner advertising, a well-rounded list of pertinent editorial articles. Some of the titles were: "Leaders in Oil-Burner Fields in Meet Here", "Dealers' Group Aids Industry", "Oil-Burner Industry Called Rival of Auto", "Principle of Oil Burner Explained", "Expert Tells of Oil Supply", "Health Board Lauds Oil-Burner Systems", "Oil-Burner Growth Compared with Auto", "Public's Knowledge of Oil Burner Small", "Cleanliness Is Big Factor." Many of these articles were written by men prominent in the oil-burner industry and well-qualified to discuss the subject they handled.

Exhibits at the Convention

IN LOOKING over the various exhibits of oil burners, one could not help but be impressed by the fact that the burners, taken as a whole, represented finished products. Almost without exception, the impression was conveyed that experimental work had been completed, the design stabilized and the machine turned out as a factory product.

Outstanding because of the large spaces occupied, the number of burners of different sizes shown and the similarity in type, were the exhibits of two of the leading west-coast manufacturers.

The S. T. Johnson Co., Oakland, Cal., exhibited nearly a dozen burners of different sizes, ranging from the largest industrial unit down to the new automatic domestic burner. This little machine attracted considerable attention, largely on account of its compactness and clean-cut design.

The W. S. Ray Mfg. Co., San Francisco, also filled two booths with their rotary type burners, the various sizes of which are adaptable for anything from an ocean liner to a small bungalow. One burner had portions of its casing so cut away as to show the essential working parts and in addition to the burners, many pictures were on display, portraying installations of Ray burners, and important commercial and industrial buildings in which these burners are installed.

Aetna Automatic Oil Burner, Inc., Providence, R. I., exhibited in conjunction with J. E. Grady Co., the Detroit representative of this company. Several sizes of the Aetna burner were shown, one being cut away to exhibit the high-class of workmanship that is characteristic of this burner. The exhibit also included a demonstration of the Aetna syphon breaker, which is used in all installations where the tank must be installed higher than the burner. The breaker prevents oil flowing to the burner at a higher rate than that required. The company also showed the Aetna automatic oil-pilot equipment which is used in suburban or country installations where artificial gas cannot be obtained. The J. E. Grady exhibited the atmospheric burner which it developed and is marketing.

The Beckwith Co., Dowagiac, Mich., focused a very complete exhibit on the Summerheat burner which attracted attention because of the method of attaching it directly to the fire door of the boiler, allowing it to swing with the door. The liberal use of aluminum as a housing for the burner unit makes it very attractive and the highly developed electric ignition attracted the attention of those technically inclined.

Combustion Fuel Oil Co., Milwaukee, Wis., exhibited three of the twelve different units manufactured for domestic and industrial work. Two domestic burners were shown, one raised for firing through the fire door and the other for installation on the ashpit door, both being equipped with Minneapolis control. A No. 6 industrial type Combustion burner, capable of firing two 150 H.P. boilers was also on exhibition. This is one of the few industrial burners that is automatically controlled. The fact that the designers of the Combustion burner have reduced its working parts to only three caused the burner to attract no small amount of attention.

The Nu-Way Corporation, Rock Island, Ill., had on display a junior model of the Nu-Way burner, which was beautifully finished in old-ivory colored enamel on the base and main part of the burner, with the cover in Dutch-blue porcelain enamel. All of the brass fittings were highly polished and the entire assembly created a very favorable impression of careful design and high-class workmanship. There were also exhibited two other Nu-Way burners, a standard 1200 type and an 1800 heavy-duty type. These burners were also resplendent in polished brass and porcelain enamel. The company maintains that, in addition to being an efficient oil burner mechanism, the burner should be so finished as to be a source of pride to the owner and in keeping with the type of basement made possible through the use of an oil burner, and frequently used as a recreation room, playroom or den.

Wayne Tank and Pump Co., Fort Wayne, Ind., displayed a cutaway burner in connection with a cutaway combustion tube, and also showed a standard Wayne burner with an illuminated display sign showing the course of flame travel in the fire box of the heating plant. The design of this burner, is unlike the more conventional types of domestic burners and the ruggedness of construction, coupled with high-class workmanship, was outstanding.

Commonwealth Engineering Co., a division of Drying Systems, Inc., Chicago, exhibited the Commonwealth automatic oil burner, incorporating a unique flexible drive from the motor to the atomizer. The company also exhibited a new type of clock thermostat operating direct from a 110 volt lighting circuit. This thermostat is unique in design and incorporates some interesting constructional features.

W. B. Wilde Co., Peoria, Ill., exhibited a Hart burner and made the first showing of its new automatic electric refrigerator, the "Hart Electric Icer." The burner showed every indication of being a production job and appeared to substantiate the statement of general satisfaction from many owners.

Silent Automatic Corp., Detroit, Mich., showed several of its burners and utilized the convention for bringing together dealers from different parts of the country. The company concentrated on sales in Detroit and Philadelphia during the past heating season, and states that in these two cities, they installed more burners than any other manufacturer. The company proposes to build ten burners this year for every one marketed last year.

Reflex Oil Burner Mfg. Co., Providence, R. I., exhibited two Reflex oil burning systems and reported an unexpected volume of business transactions.

Automatic Home Heating Co., Pueblo, Colo., national distributors of the Baker automatic oil burner, exhibited a No. 10 domestic burner, electrically connected and in operation. A cross-section of the fire pot was also on display, showing the principle involved in this burner of preheating the air and cooling the fire pot. The burner is substantially the same as the one produced last year, only minor changes being noted. Forty agents from all parts of the country and six national distributors were in attendance at the convention.

May Oil Burner Corp., Baltimore, had an interesting display built around its standard domestic burner, the exhibit being in charge of the executives of the company. The May burner is unique in being constructed of standard parts with the idea that any replacements or repairs that may be necessary can be effected without its being necessary to send to a distant factory for such parts.

Super Oil Heater Co., Hartford, Conn., had a number of burners on display and attracted considerable attention because of the compact character of the unit and its simplicity.

Bunting Iron Works, Berkeley, Cal., the third of the Pacific Coast manufacturers at the convention, exhibited the burners it has been manufacturing for many years and which are popular throughout the western states.

The Crosley Radio Corp., Cincinnati, a newcomer in the domestic oil-burner field, exhibited a burner that was noteworthy because of many unique features characteristic of the ingenuity of the chief executive of this company. The burner is made up as far as may be possible with pressed steel construction, which makes possible low-cost quantity production and results in a remarkably neat burner. There are four individual units, the burner, ignition, control and pump, each quickly detachable for service or inspection. There are only two moving parts and these, mounted on ball bearings packed in grease, exemplify the simplicity of the burner. A new departure in ignition is found in this burner which uses an electric arc operating directly across 110 volts AC or DC, with carbon electrodes. The comparatively high temperature secured through the operation of this arc would appear to make for positive and effective ignition and the functioning of this ignition device in the field will be watched with a great deal of interest.

Marr Oil Heating Machine Corp., Minneapolis, showed a Marr burner of the latest type. This burner exemplifies the high standard of construction which has been reached by a present-day domestic oil-burner. It is of the vertical-cup atomizing type and appears to be well stabilized in design and capable of operation with a minimum of service.

Automatic Hydro Oil Burner Co., Detroit, exhibited an interesting atomizing burner, utilizing a water motor for propelling the atomizing plate. The burner is simple, well-made and low enough in first-cost to find a wide market throughout the country.

Northern Machinery Co., Minneapolis, exhibited a complete line of burners of the atmospheric type, all with Minneapolis heat regulator thermostatic control. The company also exhibited a Northern heater, which is a complete heating unit, consisting of a stove in which is installed a burner operating on the same principle as the larger type. The company reports having secured several important distributor and dealer connections as a result of its exhibit.

Minneapolis Heat Regulator Co., Minneapolis, occupied three booths with a complete line of automatic heat-control mechanisms for oil burners. In addition to the well-known Series 10 relay and the standard line of motor program-switches, room thermostats and boiler limiting controls, the new Protectostat was for the first time shown. This device, as first described in the April issue of The Heating and Ventilating Magazine, utilizes the radiant heat of the oil burner flame as its operating medium. Convincing proof of the sensitiveness of this device was furnished by the demonstration on a typical burner installation where the oil-burner flame was represented by an ordinary incandescent lamp. When this lamp was flashed on, the small emission of radiant heat from it caused the Protectostat to function, and from this demonstration, its positiveness when operated with a conventional oil-burner flame may be appreciated. Another new product exhibited was the Safe Flow oil valve, which eliminates the need of an intermediate service tank and pump, where installation codes require that not more than 50 gallons of oil may be available for supply to the burner by gravity.

Honeywell Heating Specialties Co., Wabash, Ind., displayed complete control equipment on attractive panels, enabling visitors to see the actual working operation of each unit. The new Honeywell oil and gas valves were on display for the first time. This device is an electric motor-actuated valve in one unit. It may be supplied in three types, metering, non-metering and high-low flame. The Honeywell Masterstat and other well-known specialties were on display. The company was represented by eleven men from its home organization.

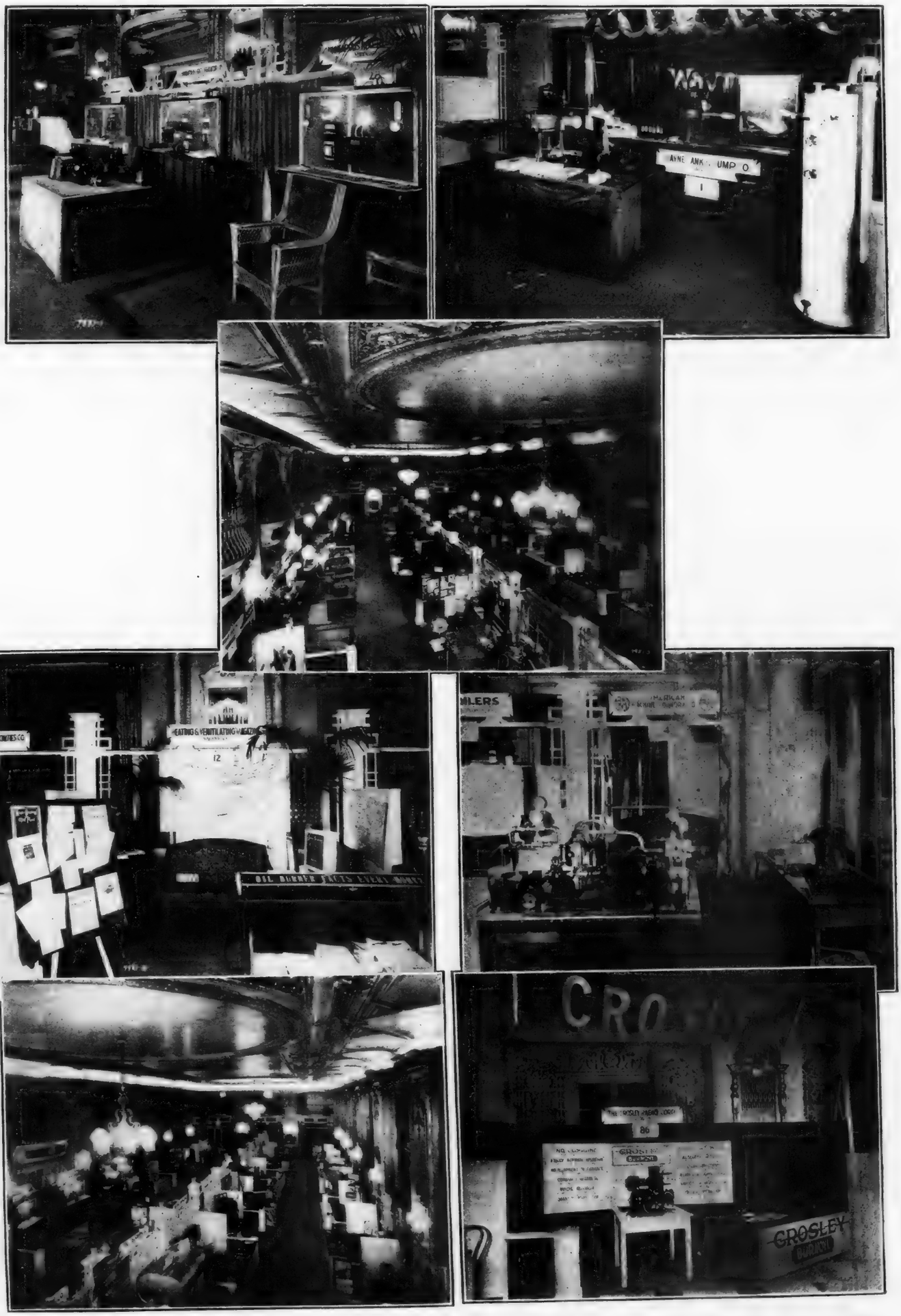
The Federal Gauge Co., Chicago, exhibited a complete line of Mercoid controls which was centered around the new type "S" Federal mercoid safety switch for flue installation. This control is designed for the protection of motor-driven burners and is so designed that it will cut off the blower motor at any given time after starting if ignition does not take place.

Absolute Con-Tac-Tor Corp., Beloit, Wis., exhibited its standard line of high voltage oil-burner controls and featured a 110 V. safety circuit. This circuit was mounted on a panel with a Webster vibrating spark coil connected into the circuit for igniting a gas flame. It is unique in that the control of the ignition and thermal safety feature is secured with the same device. A Stackswitch controls the ignition circuit and a Timed-switch acts as a monitor to shut off the ignition and permit the burner to operate normally, when a normal flame is produced. If the flame is not properly secured in a predetermined interval, the Stackswitch allows the Timedswitch to stop the burner motor. If a flame failure occurs during normal operation, the Stackswitch re-energizes the ignition circuit on a stack temperature drop of 25° F. and also cuts the Timedswitch back into the motor circuit to stop all operation if the flame is not re-established in a pre-determined interval.

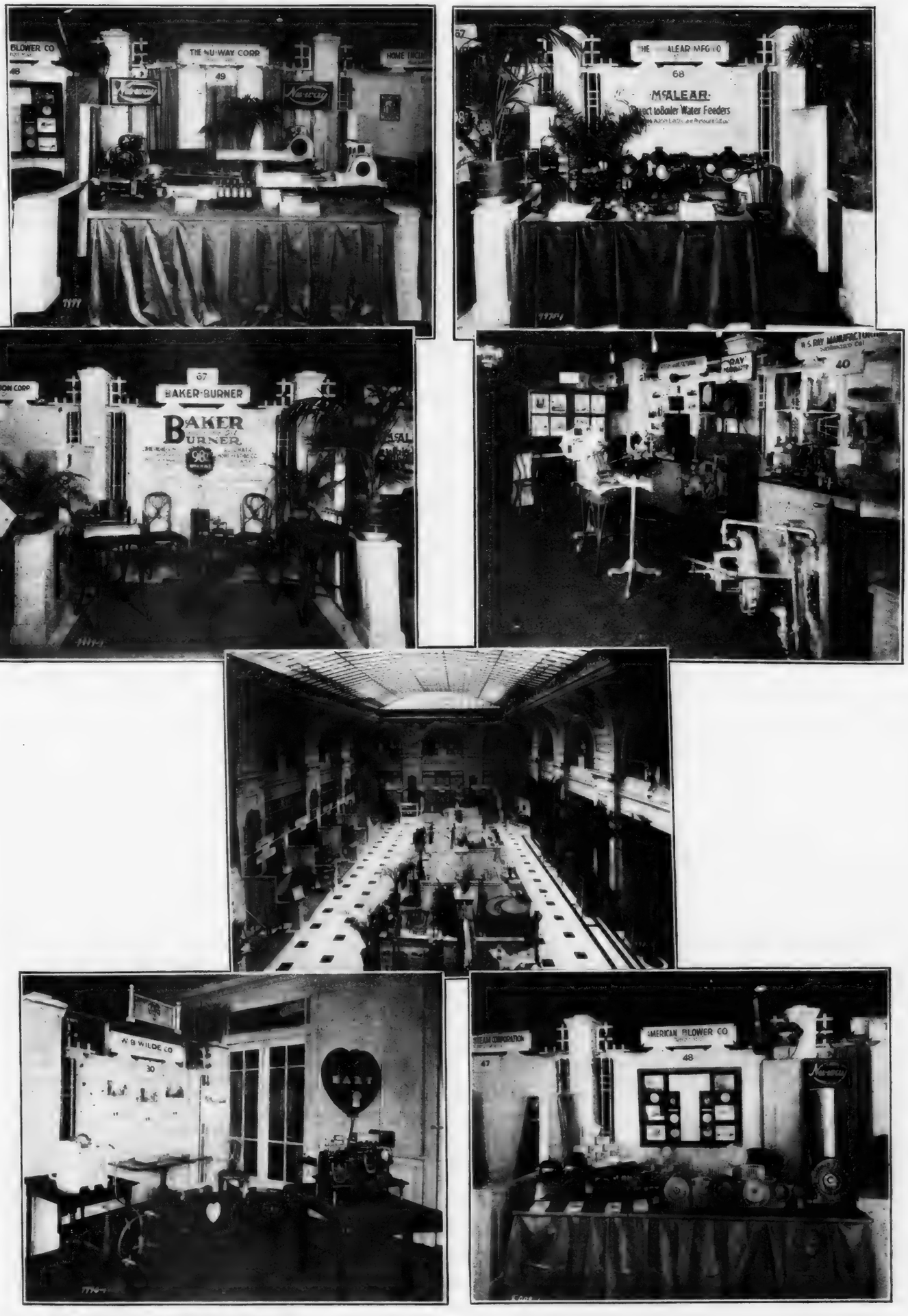
Davis & Daggett Co., Springfield, Mass., exhibited the D. & D. Safety Boiler Control as attached to the steam riser of a boiler showing various methods of attachments and of application. This control protects the boiler from becoming overheated when used in connection with an oil burner.

The McAlear Mfg. Co., Chicago, showed a complete line of McAlear direct-to-boiler water feeders, including those equipped with low water and pressure cut-out. A special development for oil-burner installations consolidates the boiler control so that the electrical circuits are very much simplified and the boiler is protected against both low water and excessive pressure.

McDonnell & Miller, Chicago, exhibited their Duplex water feed and the Duplex switch. A Duplex switch was so connected to a United States Radiator boiler that the water line could be raised or lowered at will. When the water line reached the bottom of the



American Oil Burner Association Exposition, Detroit, Mich.,



General and Detail Views of Exhibits

gauge glass, the low-water cut-off feature of the Duplex switch cut the current off an electric floor lamp, simulating a motor blower. Then, as the water level in the boiler was increased, the current was turned off again and the floor lamp illuminated the booth. By using both vacuum and pressure pumps, a very clear demonstration was given of the operation of the pressure regulation feature of the Duplex switch. Cutaway models of both the water feeder and switch were mounted on stands so that their interior mechanism and operation could be clearly seen.

Monitor Boiler Co., Philadelphia, Pa., had on display two sizes of Coil water-tube steel heating boilers and reported considerable interest in this unique construction.

Bryan Steam Corp., Peru, Ind., exhibited a cutaway Bryan generator, designed especially for oil burning.. The feature of this generator is the combustion chamber, which is so built that all air other than that supplied by the burner motor is eliminated. The essential feature of this boiler is the use of copper tubing in specially formed units that may be easily replaced if required. The design provides for rapid interior circulation and it is claimed that by virtue of the large indirect heating surface and the method of circulation, very high thermal efficiencies are shown.

An interesting feature of this boiler is the fact that a water heater for domestic purposes is built into the generator. This unit consists of a separate coil running through the hot water that is contained in the boiler. This coil is removable without interfering with any other part of the boiler and forms an effective means of securing hot water for domestic use.

Leader Iron Works, Decatur, Ill., displayed economizers for use with warm air furnaces and hot water boilers. Although these economizers, which are essentially additions to the indirect heating surface of the boiler or furnace, have been in use for four or five years, this is the first time that they have been shown at an oil-burner convention. It is claimed that material saving in fuel may be secured through their use.

The Lennox Furnace Co., Marshalltown, Ia., had on display the Torrid Zone Furnace, which is built of heavy steel plate with all joints riveted and caulked.

The Meyer Furnace Co., Peoria, Ill., exhibited the Weir oil burning furnace, which in the last few years has been developed to meet the exacting requirements of oil-burner installations. This furnace is built of steel plate, electrically welded at all points and incorporating considerably more heating surface than is common in the average warm-air furnce.

The Waterman-Waterbury Co., Minneapolis, Minn., exhibited one of the largest models of its seamless oil-burning furnace. It is stated that this model has been on the market for seven years and that it is especially adapted to use with oil burners.

The Boston Auto Gage Co., Pittsfield, Mass., exhibited a complete line of oil gages designed to meet practically any requirements of the oil-burner industry. An interesting distance gage was shown arranged for installation in a tank located either above the basement floor or buried below it. A safety strainer was also shown, combining with it a shut-off valve which is automatically closed when the strainer cap is removed. A novel working exhibit consisted of two tanks placed one above the other with an electric-driven pump set automatically controlled to allow the water to flow from the upper tank by gravity to the lower tank, when it is pumped back into the upper tank. The upper tank had a glass front through which the various types of gages could be seen in operation, exactly as they would function in a tank in service.

American Machine & Foundry Co., Brooklyn, N. Y., displayed a novel rotary-roller fuel-oil pump, which is designed for direct connection to a commercial motor and can pump oil up to heads of 150 lbs. pressure.

Basel Manufacturing Co., Inc., Kansas City, Mo., exhibited a full line of oil-burner valves and heat regulators that it has been manufacturing for many years. There was also exhibited a new combination gas and oil valve with various adjustments, which facilitate synchronizing in relation to the opening of the gas and oil valve and constitute a varied timing of each. There was also shown a complete regulating unit, which comprises a thermostat, magnetic relay-valve arranged for manual control or automatic control from the thermostat, together with automatic cutoff, strainer and air seal trip.

Wagner Electric Corp., St. Louis, Mo., exhibited several of its latest design repulsion-induction AC motors. These are of the brush-lifting type, the brushes being in use only for a few seconds while the motor is starting. This line of motors from one of the oldest manufacturers in the United States has been especially adapted to the requirements of oil-burner manufacturers.

Jefferson Electric Mfg. Co., Chicago, exhibited ignition transformers of several types.

Wm. J. Foley Co., Denver, displayed a Braid "conversion coil" which is an addition of indirect heating surface that may be attached to any steam or water boiler. It is stated that material fuel economy can be effected through its use.

Tite-Flex Metal Hose Co., Newark, N. J., exhibited various types and designs of flexible all-metal tubing for use with oil burners. This tubing is constructed by a patented process, which forms a strip of metal into tubing that may be flexed without opening up any of the joints. The tubing was demonstrated by a vibratory machine which kept two lengths of tubing constantly flexing and at the same time under a heavy vibration. During the three days of the convention, two individual pieces were flexed over 300,000 times and subjected to vibration consisting of a ⅛ in. movement for 1,500,000 times. At the end of this period, no evidences of leakage could be discovered.

American Blower Co., Detroit, exhibited a complete line of Sirocco fans and complete Sirocco utility motor driven blowers. A special feature was the use of a small utility blower with a special nozzle attachment through which a balloon about 2 ft. in diameter was kept suspended in the air 8 or 10 ft. above the booth.

The Electro-Alloys Co., Elyria, Ohio, displayed Thermalloy combustion chambers which are manufactured for the American Nokol Company in sizes from 4 to 20 in. diameters. These are a special chromium alloy.

Motor Improvements, Inc., Newark, N. J., displayed a PurOlator which is a filter capable of removing microscopic foreign solids from oil. This filter is the standard equipment of nearly a score of automotive trucks and buses and its adaptation to the oil burner industry provides a time-tried device for keeping oil clean.

Home Incinerator Co., Milwaukee, Wis., had on display several standard Home incinerator models, also a new junior size which is just introduced to the oil burner industry. This incinerator is an attractive combination for oil-burner dealers who desire to supplement their regular line with other household utilities.

The Home Appliance Corp., St. Louis, Mo., exhibited several "Model T" Electrol oil burners which were handsomely finished in the standard green with nickel-plated trimming. One burner was shown with the casings so cut away that the salient parts were exposed to view, and a second burner was operated to such an extent that the co-ordinate functioning in the cycle of operation was demonstrated. This burner emphasized the use of the continuous spark ignition. Minor improvements only have been made in the burner during the past year, the principal one being a change in design of the combustion head. The oil pump has also been slightly changed and now appears as a self sealing, packless pump. On Wednesday, the Home Appliance Corp. tendered a luncheon at Hotel Statler to dealers and guests, which was attended by nearly a hundred persons. After the luncheon, new officers and executives of the company were introduced to the "Electrol family" as the sales organization has been dubbed. A number of new distributor and dealer franchises were closed during the convention.

The Heating and Ventilating Magazine, New York, had on display a number of charts, drawings, pamphlets and other illustrations of its editorial activities in the oil burner field. A special advance printing of the April issue was distributed from the booth. Forming a background was a large scale Iso-Oil-Consumption Chart drawn on a photograph relief map of the United States.

Breese Engineering Corp., Chicago, exhibited a complete oil burning stove unit, which is particularly adapted to private garages, filling stations, and all places where coal stoves have been used in the past. The unit comes complete with a five gallon tank. This stove was designed and developed for the Quaker Manufacturing Company, by the Breese Engineering Corporation of Chicago. There was also exhibited an oil pilot-light designed for use with blower-type burners, where gas is not available.

Webster Electric Co., Racine, Wis., exhibited specialized spark coils designed for use with oil burners.

Cook Electric Co., Chicago, had a large and comprehensive exhibit of Cook pumps, which are used as standard by many burner manufacturers.

Teesdale Manufacturing Co., Grand Rapids, Mich., exhibited a pump especially devised for supplying oil from surface tanks to oil burners.

Janette Manufacturing Co., Chicago, exhibited a complete line of electric motors as designed for leading oil burner manufacturers.

American Radiator Co., Buffalo, displayed a Type A heat machine, especially adapted for use with oil burners.

Copeland Products Co., Flint, Mich., exhibited a Copeland refrigeration unit for home use.

Simplex Oil Heating Co., Providence, R. I., exhibited several burners of various types.

Automatic Burner Corp., Chicago, Ill., displayed the well-known A.B.C. burner, both in section and in operation.

The K. W. Ignition Co., Philadelphia, Pa., displayed a line of oil burner ignition equipment.

Bockfinger & Cass, Chicago, exhibited incinerators.

Sharpsville Boiler Works, Sharpsville, Pa., had on display several tanks of different types to be used either as storage or service tanks.

Michigan Tank & Galvanizing Co., Detroit, showed a number of the special tanks they build for use in connection with domestic oil burners.

Fuel Oil, New York, maintained a booth as headquarters for the publication, Fuel Oil, and delighted the delegates to the convention by the distribution of attractive canes appropriately inscribed.

Keystone Refractories Co., New York, exhibited refractory materials for use in preparing combustion chambers for such oil burners as require a built-in combustion chamber.

Minwool Insulating Co., Toledo, Ohio, displayed samples of lining for furnaces, boilers and piping.

Milwaukee Tank Works, Milwaukee, had a large display of oil tanks of various types, sizes and uses.

Dongan Electric Mfg. Co., Detroit, showed transformers and ignition devices.

General Necessities Corp., Detroit, displayed household refrigerating equipment.

Cellumoid Co., Boston, Mass., and the **Day Oil Burner Co.,** Minneapolis, shared a booth in which was displayed the Day atmospheric oil burner.

Gen-o-Gas Stove Co., Detroit, exhibited a small oil burner principally for range work.

W. H. Kratzer Co., Detroit, exhibited a line of warm air furnaces.

Underwriters' Laboratories to Label Oil Burners

A plan is being considered by the Underwriters' Laboratories of Chicago for labeling domestic oil burners. Up to the present time, oil burners have not been labeled, but each one listed as standard has been identified by some marking, which is a part of the manufacturer's trade mark.

No official standard for construction of domestic oil burners has ever been adopted. The standard has been clearly enough defined, but never has been considered official. Drafts of tentative standards have recently been sent out by the Underwriters' Laboratories to oil-burner manufacturers. The makers of burners will be given an opportunity to examine these tentative standards and will have a voice in their adoption as official. At a meeting of the Laboratories' officials, April 2, the standards were discussed openly and the discussion will serve as a basis for action by the Laboratories.

It is considered likely that domestic oil burners will fall into two general classifications, mechanical draft and atmospheric draft burners.

Research Sounds the Knell of the Steam-Type Radiator

Air Elimination, the Crux of the Problem, Found to Be as Complete with Water Type as with Steam-Type Radiators, When Air Valve is Properly Located

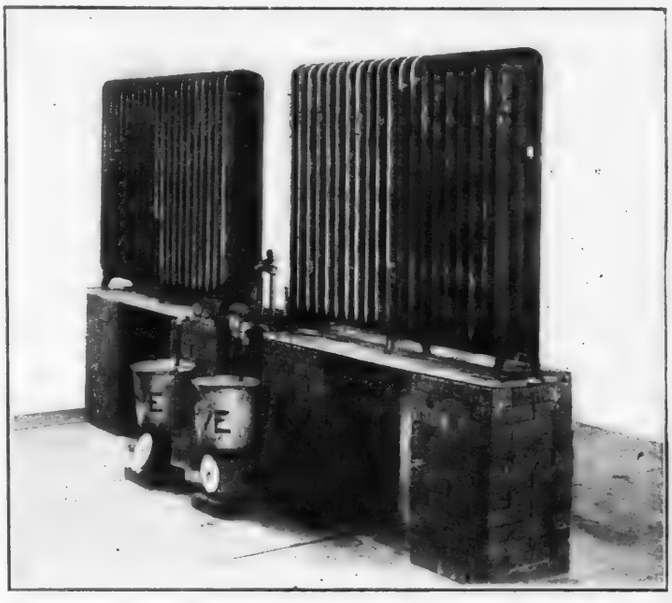


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Fig. 1. Set-up for Comparative Test of Water-Type and Steam-Type Radiators

White Line Indicates Progress of Steam Through Radiators for the Same Interval

DUE primarily to the waste elimination activities of the Department of Commerce through its Division of Simplified Practice, and, more directly, to the survey carried out by the Technical Advisory Committee of the American Society of Heating and Ventilating Engineers, data have been secured which point unmistakably to the elimination of the steam-type of radiator in American heating work.

Much of the credit for the inauguration of the movement goes to the Heating and Piping Contractors National Association, which discussed a resolution at its last annual convention providing for the discontinuance of the manufacture of the steam-type radiator. This resolution was referred to the Board of Directors for action. At a later meeting, it was voted to submit the question to the A. S. H. & V. E. Research Laboratory before making a final decision.

The proposed step was advocated at the heating contractors' convention by Major A. E. Foote of the Division of Simplified Practice of the Department of Commerce, as a part of the efforts of the Department to eliminate waste in American industries.

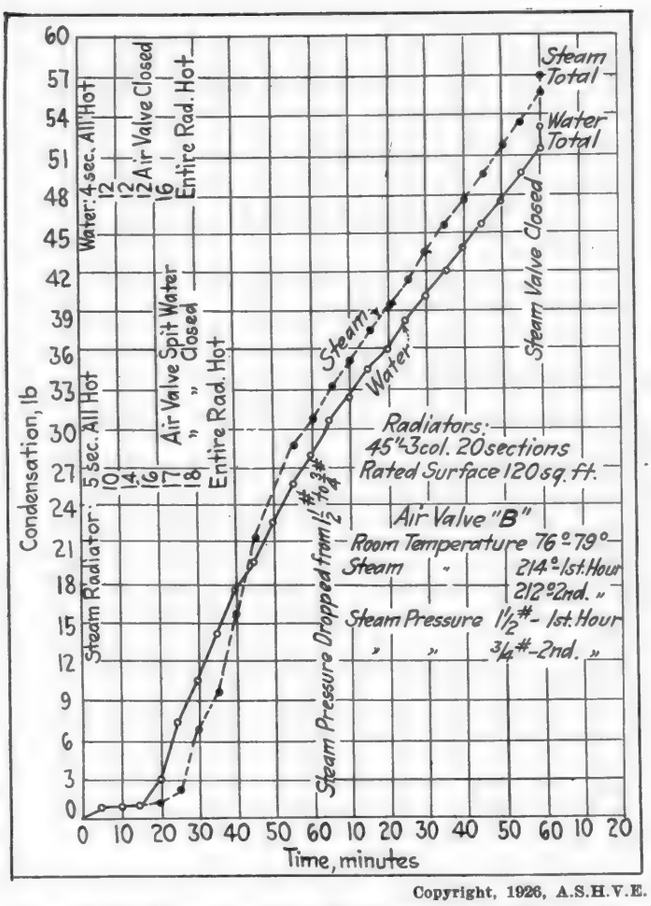
As far as the heating industry is concerned, the questionnaire sent out by the Technical Advisory Committee on Radiation, of which R. V. Frost is chairman, dealt with the economic feature and the efficiency as affected by air elimination. The answer to the economic feature from the manufacturer, the jobber and the contractor alike, states the committee, was unanimously in favor of water-type radiator, with an occasional proviso that the change bring about a price reduction. The answer to the question of efficiency as affected by air elimination was not unanimously in favor of the water type, but quite generally so. The objection came, for the most part, from the older contractors and lay particularly in the use of long and tall water radiators on one-type systems. The consensus of opinion among the objectors was that pockets of air are held in the water radiator that cannot be eliminated after the air valve has become heated and closed.

AN announcement of the American Radiator Company, effective March 15, states that the company has discontinued the manufacture of steam-type radiators. This action, it is added, was taken after careful research and testing in the company's laboratories, which furnished convincing evidence that the water-type radiator was as efficient on steam jobs as the steam type.

Although the committee expressed its feeling that it had no authority to recommend that the steam-type radiator be abandoned, it went on record as stating that "the steam radiator has no points of superiority over the hot water radiator, in either heating effect or operation, and the hot water radiator, as now manufactured, can be used for all installations of steam heating; further, with the air valve tapping located one-third the height from the bottom of the last section, the hot water radiator does not require alteration to make it effective for one-pipe steam heating." To this the committee was able to add as a statement for record, that it is virtually the unanimous opinion of all the varied interests in the heating industry that the exclusive use of one type of radiation will improve marketing conditions.

Tests Conducted at the Research Laboratory

The work at the Research Laboratory was directed to the question of air elimination, as brought out by the returns



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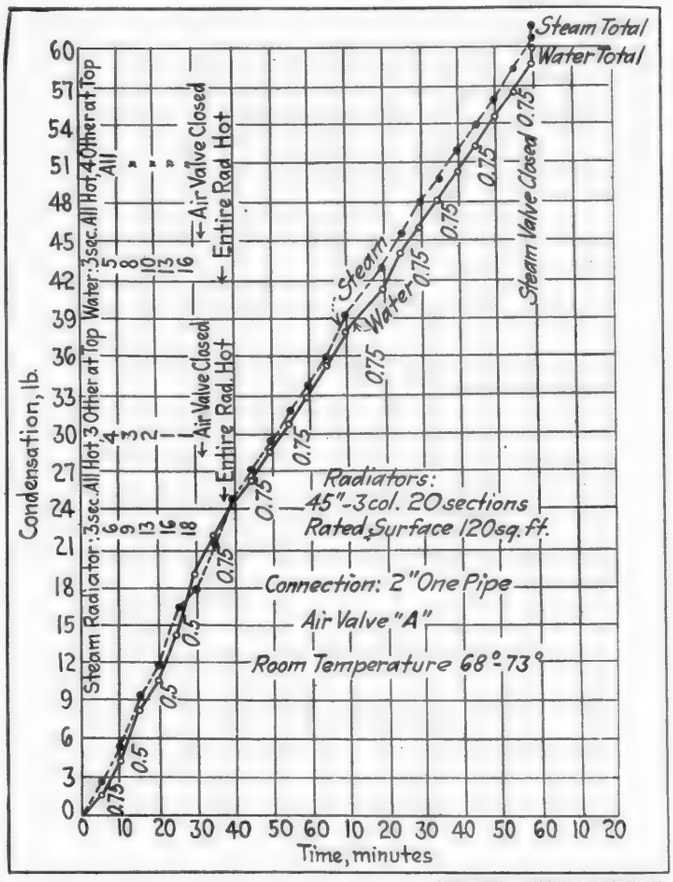
Test of Air Elimination from Radiators, 1¼-in. Connection, One-Pipe



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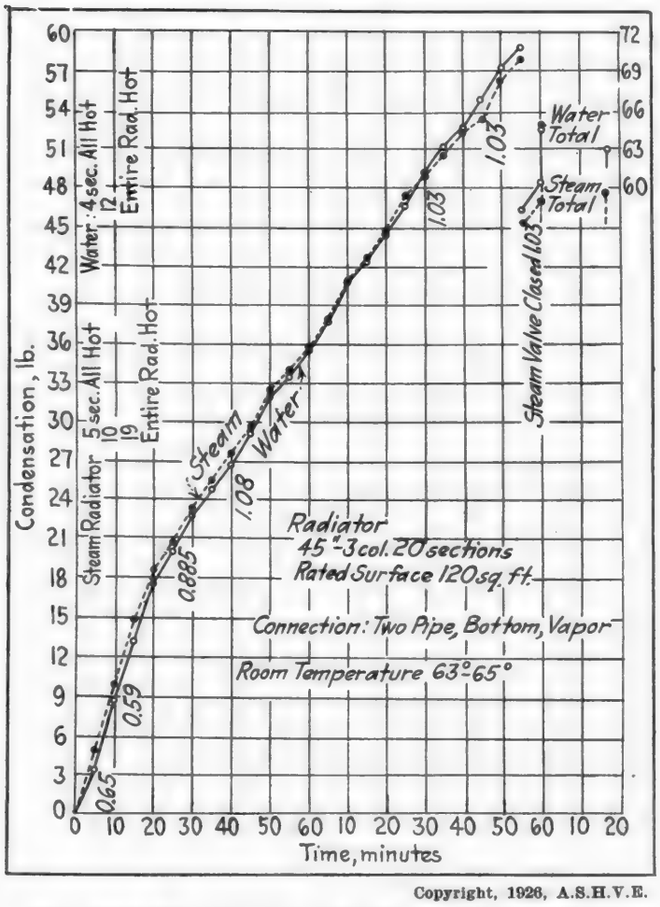
Test of Air Elimination from Radiators, 2-in. Connection, One-Pipe



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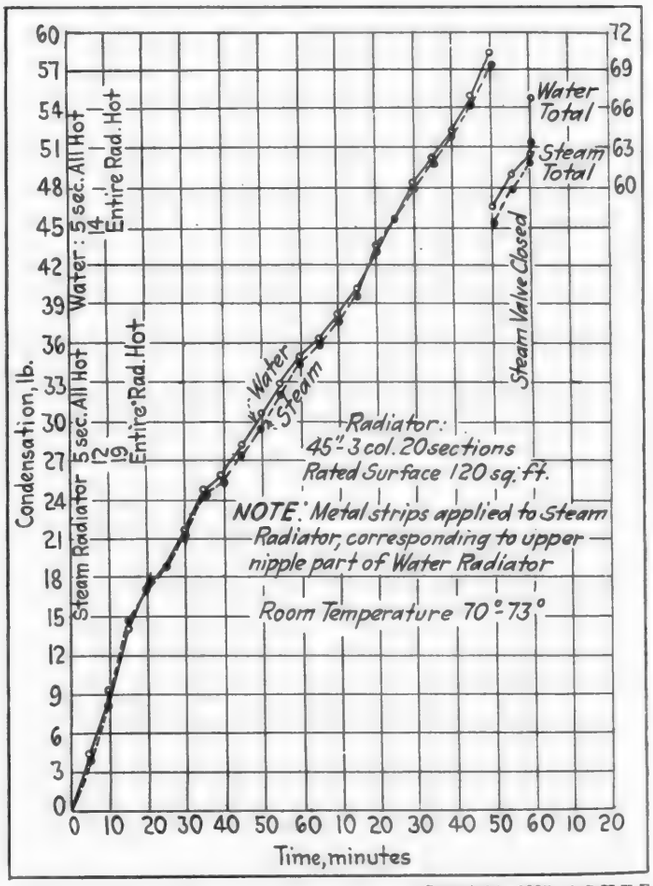
Test of Air Elimination from Radiators, with Metal Strips Applied to Steam Radiator in Last Section



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Test of Air Elimination from Radiators, with Two-Pipe Bottom Connection

on the committee's questionnaire. A comparison was made of the heating effect of the two types of radiators, since the measure of this heating effect would answer completely and without possibility of contradiction, the question of air elimination.

Two radiators of equal size, one steam and one water, standard in every respect, without special features as changed air tappings or special plugs in the upper air nipple part of the water radiator, were set up in a large room at the Bureau of Mines, in such a position that the exposure of the two radiators would be exactly the same. Steam from the heating system of the building was brought to a separator located close to and equidistant from the supply end of the two radiators. From the separator to the supply connections, identical connections were made so that there could be no variable factors of steam resistance to confuse the problem. The steam pressure was measured at the separator by a mercurial pressure gauge. The condensation was trapped at the outlet from the radiator and weighed in the usual manner.

In running the tests, steam was admitted to the two cold radiators at the same instant. The progress of the steam through the two radiators was noted at five-minute intervals, observation being made by sense of heat to the hand. The time was noted when the air valve closed, together with the weight of condensation for the five-minute interval and the steam pressure. A two-hour test proved long enough for all observations of interest and at the end of that period, the steam valves were closed, the water of condensation remaining in the radiator allowed to drain back, and the excess noted.

Tests were first run on 26-in. 2-col. 20-sec. radiators, rated at 53 1/3 sq. ft. with vapor and with 1¼-in. and ¾-in. one-pipe connections. The vapor and the 1¼-in. one-pipe were practically equal in condensing effect, the steam type radiator in each case condensing about 1½% more steam, although the water radiator heated throughout in the same length of time. When the ¾-in. one-pipe connection was used, the condensation would not return during the hour of test, but at the end of the hour, after the steam valve had been closed, a volume of condensation would return on the steam radiator, fully equivalent to the normal condensing capacity of the radiator, but the volume of condensation from the water radiator fell off fully 30%. This latter test was not considered, however, in arriving at our conclusions, as a ¾-in. one-pipe connection on a 50 sq. ft. radiator is entirely out of the question. The observation is recorded as a possible indication of the cause for some one-pipe failures.

In arriving at conclusions as to the competitive value of the two types of radiators, 45-in. 3-col. 20-sec. radiators, rated at 120 sq. ft., were used. The tests on these radiators were all recorded on charts, which indicated the total accumulated condensation for the period of the tests on the water and steam radiators, respectively.

In connection with these tests, it should be borne in mind that on a one-pipe system, a 2-in. connection is the standard recommended size for this radiator and the 1¼-in. connection was tested to determine its effect, if any, on air elimination. With the water radiator, a 1¼-in. one-pipe connection had less tendency to hold back the water of condensation, but the steam radiator ran approximately 7% better than the water type in total condensation. With a 2-in. connection one-pipe, the steam and water radiators ran practically parallel, while the difference in total condensation for the steam and water radiators was only 3%. In a comparison of the results obtained with 2-in. one-pipe, two-pipe connection and vapor connection, there was practically no difference in the rate of return of condensation and the difference in the total condensation of the steam and water radiators was practically the same, 3%. This slight percentage in favor of the steam radiator, it was stated, can be attributed to decreased convection currents through the center of the radiator caused by the obstruction by the upper nipple part of the water radiator, for in tests run on the two radiators the same as before, with the addition of metal strips placed between the top of the sections of the steam radiator in such a manner as to take the place of the upper connections between the sections of the water radiator, the steam radiator condensed 5% less steam than the water type. In this test, however, the metal strips not only interfered with convection currents the same as the connection in the water radiator, but did not have the radiating effect of the connections in the water radiator, so that the percentage of 5% less, for the steam radiator, is a slight exaggeration.

The tests at the Laboratory showed that different type air valves had practically no influence on the condensation, other than that the size of the port opening permitted more rapid heating up of the radiator. The best of the air valves would spit water when the pipe connection was too small and the poorest of the air valves did not restrict the flow of condensation when the connections were of proper size. This statement must not be considered as an expression of opinion that the quality of the air valve is not a factor, it simply indicates that the question of quality in the air valve did not enter into this problem.

In the question of weight, the steam-type radiator, 26-in. 2-col. in the pattern tested, was 4% lighter than the water-type, and in the 45-in. 3-col. size, the steam type was 5% lighter. The question of weight is not, however, taken into account in the committee's conclusions.

(To be continued)

St. Louis's Smoke Abatement Campaign

Eighteen committees, which in the past have worked for smoke abatement in St. Louis, have merged into one organization. The campaign will follow the suggestion made in the recent address of Dr. O. P. Hood, chief of mechanical engineering of the Bureau of Mines, in Washington, embodying his conception of the six essentials of a successful smoke abatement program. These he lists as: An aroused public opinion, vision on the part of the leaders directing the movement, technical ability, a thorough smoke survey, co-operation of municipal officials and co-operation of the agencies interested in or affected by the smoke problem.

A resolution proposed by E. B. Langenberg, president of the St. Louis Chapter of the American Society of Heating and Ventilating Engineers and adopted by the chapter, providing for regulation of flue, furnace and boiler sizes and the education of the home furnace tender, was adopted as part of the new organization's program. Earle Ormsby was elected chairman of the combined committees and William G. Christy, secretary.

Cold Weather Mortar Mixture

Acute weather conditions in the present winter season have brought peculiar emphasis to the cold weather problems of the contractor and builder. Of these, mortar is one of the most important. To find a mortar that will fill the requirements for compressive and tensile strengths, retain its workability under severe conditions and yet be economical, has been one of the most important questions in the field.

Eight lime and Portland cement mixes and four bricklayers' cements were recently tested at the University of Wisconsin for shear, tensile and compressive strengths after curing in warm and cold storage. From these tests a lime-cement mortar composed of one part cement, two parts lime and nine parts sand was recommended for winter use. Strength, workability and economy requirements are all fulfilled by this 1:2:9 mortar.

An advantage of this mixture is that it will spread easily under severe conditions, is highly plastic and easily handled. Another feature for consideration is that the mix is low in cost. The materials are readily available in all sections of the country and may be purchased under standard A.S.T.N. specifications, which include uniformity.

With building operations being carried further into cold weather with profit to the contractor, convenience to the owner and an extended season of employment for the workmen, the findings of the tests conducted at the University of Wisconsin will be of wide use.

American Society of Heating and Ventilating Engineers

Stage Set for Society's Summer Meeting

A UNIQUE experience awaits the members of the American Society of Heating and Ventilating Engineers who are scheduled to hold their semi-annual meeting in the heart of the Blue Grass region, at Lexington, Ky., May 26-28, with headquarters at the Hotel Phoenix. This is the first time the society has gone so far south for one of its meetings and, it is said, a treat in the way of Southern hospitality awaits those who attend.

Following is the tentative program:

MORNING SESSION, MAY 26

Registration.
Greeting by Mayor Yancey.
Response by President William H. Driscoll.
Paper: "Humid Air as a Heating Medium," by Foskett Brown, Nashville, Tenn.
Paper: "Developments of the Art of Heating in Canada," by Professor L. M. Arkley, Queens University, Kingston, Ont.
Paper: "Results of Insulating a House," by H. S. Ashenhurst and S. R. Lewis, Chicago.
Paper: "Friction of Water in 90° and 45° Elbows," by Professor F. E. Giesecke, University of Texas, Austin, Texas.
Paper: "Development and Characteristics of a Carbon Monoxide Recorder," by S. H. Katz, U. S. Bureau of Mines, Pittsburgh, Pa.

THURSDAY MORNING, MAY 27

Report on Heat Transmission Investigation, by Professor F. B. Rowley, University of Minnesota, Minneapolis, Minn.
Reports of Technical Advisory Committees on Research.
Paper: "Effective Temperatures for Persons Lightly Clothed in Still Air," by F. C. Houghten, W. E. Teague, and W. E. Miller.
Paper: "Work Tests Conducted in Atmospheres of Low Temperature in Still and Moving Air," by W. J. McConnell, Philadelphia, and C. P. Yaglogiou, Boston.

FRIDAY MORNING, MAY 28

Paper: "Observing Warm Air in Circulation," by Thornton Lewis, Philadelphia.
Paper: "Rational Ventilation," by Dr. J. E. Rush, University of Kentucky.
Paper: "Heating and Ventilating a School Without Direct Radiation," by J. R. McColl.

Included in the social events will be a golf meet Wednesday afternoon at the Ashland Golf Club, in Lexington, followed by a theatre party the same evening. On Thursday there will be a luncheon on the campus of the University of Kentucky and later the same day an entertainment will be given by students of the College of Engineering as a part of Annual Engineers' Day. In the evening the College of Engineering students will stage their "Engineers' Carnival."

Friday afternoon will be devoted to a trip to the estate of William E. Sims where a typical Kentucky burgoo picnic will be served. This will be followed by an automobile trip through the Blue Grass section, with stops at some noted farms and stock-breeding estates.

The society's formal banquet will bring the meeting to a close Friday evening.

The committee on arrangements is made up of Dean F. Paul Anderson, chairman; C. V. Haynes, New York; J. I. Lyle, Newark, N. J.; Thornton Lewis, Philadelphia; and H. C. Murphy, Louisville, Ky.

Research Committee Appointments

In connection with the work of the Research Laboratory, the appointment is announced of L. A. Harding as chairman of the Sub-Committee on Heat Losses from Building Construction. Another appointment is that of Albert Kellogg of Boston, as chairman of the Sub-Committee on Rating Low-Pressure Boilers. This committee will co-operate with the Bureau of Mines in accordance with an invitation from the Fuel Division, which is in charge of Percy Nicholls.

As announced in the March issue, the new chairman of the Committee on Research is H. P. Gant, of Philadelphia. Under his leadership, the work is already well advanced and a budget has been adopted for 1926 covering the investigations in connection with five major problems, each under the direction of a technical advisory committee.

President Driscoll Goes "On the Air"

As the first step in a movement to reach the public by means of the radio, President William H. Driscoll of the American Society of Heating and Ventilating Engineers, broadcasted a talk through Station WMCA New York, March 18, dealing with "How to Heat the Home for Comfort."

After dismissing the use of soft coal as an undesirable fuel for domestic heating, he explained why the smaller sizes of anthracite, such as buckwheat and pea coal, were not so well fitted for domestic use as the larger sizes. He then dwelt upon the advantages of burning coke citing his own home as an example. On the subject of oil burning his advice was "do not be deceived with the idea that you are going to save a great deal of money on fuel. If your burner is all right you are going to enjoy it thoroughly but your fuel cost for oil is likely to be higher than it was for coal." The use of steam or hot water, he said, was a matter of taste and there is no real advantage of one method over the other.

In closing Mr. Driscoll said, "Heating your home is not a luxury—it is a necessity. It adds to the health, comfort, and well-being of your entire family and yet the appalling number of failures in heating plants in the homes of people of this country is due more to the inconsistency of the attitude of people towards the relatively important things in their lives and the relatively unimportant."

Co-operation of Society with American Public Health Association

Co-operation between the American Society of Heating and Ventilating Engineers and the American Public Health Association is provided for in the designation of committees representing both organizations to study the subject of building ventilation. President Driscoll has designated the Committee on Standards of Ventilation as the logical one to co-operate with the committee of the American Public Health Association. This committee is comprised of the following: W. H. Carrier, chairman; F. R. Still, vice-chairman; E. P. Bradley, F. R. Ellis, E. S. Hallett, Thomas Chester, Dr. E. V. Hill, F. C. Houghten, John Howatt, J. R. McColl, R. R. Sayers, Perry West, and A. C. Willard.

For the American Public Health Association, President Winslow has announced the appointment of the following: Clarence M. Baker, chief engineer, Wisconsin Department of Health, Madison, Wis., chairman; Leonard Greenbury, 333 Cedar Street, New Haven, Conn., Secretary; Earle B. Phelps, 46 Phelps Road, Ridgewood, N. J.; Dr. Philip Drinker, 55 Van Dyke Street, Boston, Mass.; H. F. Bronson, Division of Housing, Pennsylvania State Department of Health, Harrisburg, Pa.

New York Chapter Hears Talk on Domestic Oil Burning

P. E. Fansler, associate editor of THE HEATING AND VENTILATING MAGAZINE, was the principal speaker at the April meeting of the New York Chapter, held

April 19 at the Building Trades Club, New York.

Mr. Fansler's subject was "Oil Burning in the Home." He referred particularly to the astonishing growth of the domestic oil-burner industry during the past year, and of the prospects during the coming year of its exceeding in volume the sales of all other apparatus for domestic heating. He likened the development of oil-burning apparatus to that of automobiles and radio, and felt that the industry was rapidly reaching a stabilized basis in the design and construction of the burners themselves, as well as in its methods of doing business. He told of the progress which has been made toward establishing a code of ethics among the manufacturers in the preparation of sales literature and advertising.

The fact that the leading manufacturers have already agreed to such a code is evidence, he said, of the growing stability of the industry, and of its chances for rapid progress along the right lines. Too many installations, he said, have been made without the requisite knowledge of the heating requirements and, for that reason, a closer co-operation between the oil-burning industry and the heating industry was highly desirable.

Referring for a moment to his work as secretary of public relations for the A. S. H. & V. E., Mr. Fansler stated he had already been able to interest a number of prominent oil-burner executives in the work of the society, and had secured their applications for membership. These men, he added, may be expected to contribute much to the science of heating in connection with oil, and will, no doubt, be numbered among the society's most valuable members.

Mr. Fansler's talk held the close attention of the gathering and was followed by a lively discussion in which many questions were asked, showing how keen is the desire for information on this subject. Among those who participated in the discussion was Dr. Charles W. Brabbée, research engineer for the American Radiator Company, who told how difficult it is to make direct comparisons of the comparative efficiencies of oil-burning and coal-burning plants, due to the fact that so much depends upon the individual applications. As an illustration of this, he presented graphs, showing how the condensation in a radiator may vary as much as 30% without any difference in its efficiency, due to its location underneath a window or near an outside wall. This, he said was accounted for by the fact that in one case there was but a small gap between the floor and ceiling temperatures, whereas, in the other case, there was a wide difference.

Western New York Chapter Host to Engineering Students

Sixty-five senior engineering students, all from the University of Kentucky, College of Engineering, led by Dean F. Paul Anderson, Assistant Dean W. E. Freeman and Professors D. V. Terrell, J. B. Dicker and L. S. O'Bannon, were guests of the Western New York Chapter at its April meeting, April 5, at the Hotel Buffalo.

Dean Anderson was the principal speaker of the evening. He told of the pioneer work done by the Research Laboratory in Pittsburgh and gave a brief outline of the preparations being made for the summer meeting of the Society in Lexington, Ky., May 26-28.

Assistant Dean Freeman, Professor Dicker and C. W. Farrar also spoke. The well-known film, "The Story of Power," was then presented and was followed by an hour of professional entertainment.

Upon unanimous vote the chapter adopted a proposal to affiliate for a period of one year with the Engineering Society of Buffalo.

President Driscoll Outlines Society's Publicity Plans Before Illinois Chapter

Details of the society's publicity plans, with special reference to the work undertaken by the society's Department of Public Relations, were outlined by President William H. Driscoll at the April meeting of the Illinois Chapter, held April 12 at the Hotel Sherman, Chicago.

President Driscoll stated at the outset that the Illinois Chapter had always been an inspiration to the entire society. He stated that the work of the Department of Public Relations under P. E. Fansler, the newly-appointed secretary of public relations, will be to make the society known to the public, and acquaint the public with the facts obtained in the matter of open-window ventilation. He anounced, in this connection, that the Metropolitan Life Insurance Company had cancelled its booklet "The Janitor and the School Child," which was recently published by the company under the authorship of Dr. C.-E. A. Winslow.

Mr. Driscoll stated that the efforts of Secretary Hutchinson had placed the society in the strongest financial position it had ever enjoyed and that this would permit the financing of the publicity work to be done by Mr. Fansler.

The city of Detroit, said Mr. Driscoll, has turned over the use of two schools, one equipped with mechanical ventilation and the other with open-window ventilation, for a series of tests which would extend over the next two years. This, he said, will provide a thoroughly practical and conclusive demonstration as to the two methods of ventilation. He added that the co-operation of the open-window advocates had been obtained, and it was hoped a tie-up would also be made with the Architects' Small House Service Bureau.

The publicity program also includes radio talks on heating and ventilating for the interest and guidance of the public.

Mr. Driscoll had some comments to make on the open-window propaganda, and referred particularly to the failure of the National Education Association, at its recent meeting in Washington, to endorse the open-window ventilation program offered at one of its group meetings by Dr. Winslow.

In the ensuing discussion, Mr. Driscoll stated that the control of one of the Rochester Schools has been given to the society and the control of the other to the American Public Health Association. The society, he declared, will accept the results of these Rochester tests and others that may be made, and will bow to the truth, regardless of what it may reveal.

Others who addressed the meeting were the new secretary A. V. Hutchinson, and Secretary of Public Relations P. E. Fansler, who told of some of the plans that are being formulated by his department.

John Howlett stated that the society and others could draw a lesson from the united action of the medical men. It was very rare indeed, he said, to find one doctor speaking disparagingly of another in a professional way. He commended this esprit de corps to the attention of the chapter members.

New members elected were E. V. Baker, J. H. Olson, A. P. Seltzer of the American Radiator Company, and Louis Ebin of the Phillips-Getschow Company, all of Chicago.

The chapter's May meeting will be devoted to a golf tournament and dinner-dance. Arrangements will be in charge of a committee consisting of E. P. Heckel, Secretary Thomas and Carl Johnson. The golf meet will be held probably at Wilmette, and the dinner and dance probably at Westmoreland.

Seventy-two members and guests were in attendance.

Chapter Notes

F. C. Houghten, director of A. S. H. & V. E. Research Laboratory, Pittsburgh, was the main speaker at the March meeting of the Cleveland Chapter.

William A. Grossman, of the Intermountain Insulation Company, spoke on building insulation before the Colorado Chapter at one of its recent meetings.

A paper on "Window Ventilation," by E. K. Campbell, was a feature of the February meeting of the Kansas City Chapter. Mr. Campbell's proposal was re-circulation of air as the solution of the problem of mechanical versus open-window ventilation.

R. V. Frost was the principal speaker at the February meeting of the Philadelphia Chapter. Mr. Frost told of the work done recently in rating and testing radiators, his remarks being illustrated with lantern slides.

W. H. Carrier was the principal speaker at the March meeting of the Pittsburgh Chapter, his subject being

"Theatre Heating and Ventilating." At the same meeting, J. B. Walker presented a report of the board of governors on the proposed Heating Research Residence. It was voted to refer the matter back to the board of governors for further consideration and investigation, with a view of having definite recommendations presented at the April meeting.

At the March meeting of the St. Louis Chapter, Robert Gordon spoke on the subject of flue construction and urged the adoption of an ordinance covering this matter. He felt that this was the only means by which the investor could be made to conform with the standard sizes required for heating plants. During the past year, he stated, the flues in 318 industrial plants, 222 apartments, 114 bakeries and 7 churches had been corrected.

Samuel R. Lewis was the guest of honor at the February meeting of the Wisconsin Chapter and gave an illustrated address on "Distribution in Heating and Ventilation." At the March meeting, the principal speaker was Professor A. C. Willard, of the University of Illinois, who told of the research work which has been carried on at the University of Illinois in connection with warm-air heating. Among the other guests were Professor G. L. Larson, head of the Department of Mechanical Engineering at the University of Wisconsin and former Professors Jasper and Godeke, of the University of Illinois, both of whom are now located in Milwaukee.

President Driscoll addressed the Wisconsin Chapter on the subject of open-window ventilation at its April meeting, held April 13 in Milwaukee.

Warm-Air Furnace Manufacturers at Annual Meeting Plan Extensive Publicity Campaign

AN appropriation of $53,000.00, to be spent during the coming year on advertising and publicity work, was the outstanding action taken at the thirteenth annual convention of the National Warm-Air Heating and Ventilating Association, held April 14-16, in St. Louis. The appropriation carried out a recommendation made by L. Wayne Arny, Director of Public Relations, who declared that the industry would be justified in spending $500,000 for this purpose during the coming year. He urged that if once begun, the campaign should be continuous and that the advertisers be prepared to carry on a campaign for at least five years.

Of the total appropriation, $40,000 will be spent for actual advertising and remainder for publicity work. The sums will be raised through an assessment of $10.00 as an extra unit charge on each member to carry on the publicity work and a $50.00 maximum unit charge to be assessed and used solely for advertising purposes. Resolutions to this effect were offered by H. T. Richardson and were carried unanimously.

PRESIDENT'S ADDRESS

In his annual address, President E. B. Langenberg spoke glowingly of the progress being made by the association and of the effective work of Secretary Allen W. Williams and Director of Public Relations L. Wayne Arny. The fact that some salesmen are making statements to the effect that their furnaces have been tested at the University of Illinois and have proven to be the best of those tested brought the comment from President Langenberg that, "such a statement, on the face of it, should warn any observant installer that the salesman's whole conversation is full of inaccuracy and misrepresentation. I do not think it is necessary to itemize any more statements because this happens to be the most dangerous one that can be used. Should it be persisted in it will force the organization to take a decided stand against any member who continues to make such statements. I am quite sure that our members understand the seriousness of permitting this to continue and in the name of the association I ask you to see that a notice is mailed to your salesmen requesting them to discontinue making such statements in the future."

"Another liability," he said, "which will have to be watched very closely is misleading copy for advertising, which refers to our research work. The policy of the organization is governed by our contract with the University of Illinois, and is set out quite definitely in the reports of the advisory committee. You are dealing with the State of Illinois when you violate the terms of this contract. This advertising copy has been handled by the executive committee. That is as far as matters of this kind should ever go. I can say this, that our members have co-operated with the executive committee 100% when this matter was called to their attention, but such a liability should be eliminated positively and definitely."

President Langenberg referred to the fact that there are about 150 concerns which are not members of the organization and some 25,000 furnace installers who are possible associate members. "How much more," he stated, "could be accomplished and how much more rapidly could our work progress were it possible to secure the co-operation of these men who now remain outside and aloof from our work."

SECRETARY'S REPORT

Secretary Allen W. Williams in his report spoke of the statistics which will shortly be available through the biennial census of manufacturers for the year 1925, conducted by the Census Bureau of the Department of Commerce. Through the efforts of the association's officers, he stated, statistics from the 1925 biennial census relative to warm-air furnaces will be separated from those of other heating apparatus. Secretary Williams brought out the point that the proportion of residential buildings compared with other types is growing every year. In 1925, it was 62%, whereas in 1924, it was but 51%, which was in itself a material increase over previous years.

The work of the Research Advisory Committee had not been heavy, due to the fact that research programs had been laid out well in advance. On the subject of oil burners, Secretary Williams stated:

"There has been a marked increase in the number and variety of inquiries relative to the use of oil as a fuel in warm-air furnaces. Apparently consumers are more interested than manufacturers and installers of our heaters. The lack of definite reliable information makes it difficult to answer entirely numerous letters received on this subject. Unbiased educational data would be helpful."

For the Joint Code Committee, Professor J. D. Hoffman stated that copies of the Standard Furnace Code have been sent out to a total of 30,000 and there are now in preparation for mailing 20,000 additional copies. Among the suggestions for changes in the code, he mentioned the insertion of a statement that the code stands for a gravity system of warm-air heating. Another was that the factor under item F on chimneys be reconsidered and altered to meet the chimney requirements. A third suggested a change in connection with wall stack sizes while a fourth concerned the method of determining the size of the furnace. No action, however, was taken on these matters.

One of the principal speakers at the meeting was Dr. E. Vernon Hill of Chicago, who delivered an address on "Learning by Experience." His talk was devoted to the modern needs of air conditioning.

ACTIVITIES OF DEPARTMENT OF PUBLIC RELATIONS

For the Department of Public Relations, Director L. Wayne Arny told of the activities of this department, which included the distribution of over 27,000 dealer books and 18,000 copies of the "Furnace Installer." In addition, 308 speeches on warm-air heating, for delivery before various clubs, have been written in answer to that many requests. Sales talks to the number of 126 have been prepared for delivery before sales

conventions. The number of pledge cards, signed and returned by installers, totaled 1027. There have been released 64 stories to newspapers, with a total circulation of 1,958,331. Of the comfort meters, 75 have been sold.

Mr. Arny then launched his recommendation for a national advertising campaign, which was favorably acted upon by the meeting.

Thursday's session was devoted almost entirely to the research work which had been done at the University of Illinois since the December meeting. The result of this work was presented by Professors A. C. Willard, D. S. Day and A. P. Kratz. The information presented will be published later in bulletin form by the university and will then be generally available.

All of the present officers were reelected. H. T. Richardson of the Richardson & Boynton Co. was appointed chairman of the Publicity Committee in place of E. F. Glore, who has resigned, due to his retirement from the Abram Cox Company, of which he was vice-president and general manager.

National District Heating Association

Forthcoming Annual Meeting to Feature Symposium on District Heating

DETAILS of the program for the seventeenth annual convention of the National District Heating Association, to be held at Niagara Falls, June 1-4, with headquarters at the Hotel Niagara, include an important symposium on recent developments in and the future trend of district heating, together with a report giving practical results of the use of fuel-oil in heating. Following is the program in full:

AFTERNOON SESSION, JUNE 1

President's address.
Secretary-treasurer's report.
Technical secretary's report.
Report of executive committee.
Appointment of nominating committee.
Report of Research Committee, F. B. Orr, chairman.

EVENING SESSION, JUNE 1

Symposium of Recent Developments in and the Future Trend of Central Station Heating, illustrated by moving pictures, with papers and addresses by James D. Hurd, president of the New York Steam Corporation; J. H. Walker, Detroit Edison Company; C. H. Day, Cleveland Electric Illuminating Company; W. W. Stevenson, Allegheny County Steam Heating Company, Pittsburgh; R. D. DeWolf, Rochester Gas & Electric Corporation; and L. E. Young, Union Electric Light & Power Company, St. Louis.

MORNING SESSION, JUNE 2

Report of Station Operating Committee, R. G. Felger, chairman. Practical results of the use of powdered fuel; also results of the use of fuel-oil in heating and of electrically-heated boilers in Canada.
Address: "Fin-Tube Type of Boilers," by Thomas E. Murray, New York Edison Company.
Report of Rates and Regulations Committee, John W. Meyer, chairman.
Manufacturers' Round Table.

MORNING SESSION, JUNE 3

Report of Operating Statistics Committee, J. C. Butler, chairman.
Report of Hot Water Committee, R. C. March, chairman.
Report of Heat Utilization Committee, J. E. Seiter, chairman. With details of the association's new manual on "Economic Principles in the Use of Heat."
Address: "The Orifice Method of Heat Regulation," by V. W. Hunter, Detroit.
Election of officers.
Manufacturers' Round Table.

MORNING SESSION, JUNE 4

Report of Distribution Committee, W. W. Stevenson, chairman.
Report on Distribution Manual, D. S. Boyden, Boston.
Address: "Welding Pipe," by Albert W. Moulder, Cleveland.
Reports of miscellaneous committees.
Manufacturers' Round Table.

The association's annual banquet will take place Thursday evening at the Hotel Niagara, with addresses by Mr. Searle, and Alexander Dow, president of the Detroit Edison Company. These will be followed by entertainment features in charge of a special entertainment committee. This part of the program has come to be looked forward to as one of the characteristic features of the meeting and in recent years has taken the form of a skit with plenty of "local color."

Wednesday afternoon, June 2, the entire convention party will be the guests of the American District Steam Company on an outing which will include golf and an automobile drive. Thursday afternoon, June 3, will also be given over to golf for the men, at the Niagara Falls Country Club, located at Lewiston Heights, N. Y.

Oil-Burner Manufacturer Offers Close Co-operation With Chicago Heating Men

A significant step toward closer co-operation between the oil-burner industry and heating engineers and contractors was taken at a dinner and entertainment to the heating contractors of Chicago, given April 14 at the Illinois Athletic Club, Chicago, by the Commonwealth Engineering Company, a division of Drying Systems, Inc., manufacturer of Commonwealth oil burners.

According to an outline of the company's policy in the sale of their burners, given by C. H. Foulds, R. W. Barry, R. E. Lippert and C. H. Gagen, of the Commonwealth Engineering Company, all installation and service work to be done by the company and every burner marketed, whether sold by the company or by a heating contractor, will include a commission to be paid to some heating contractor.

W. B. Graves and George H. Kirk, of the Chicago Master Steamfitters' Association, spoke in commendation of the plan and cited numerous instances where lack of competent heating counsel in the installation of oil burning equipment had resulted in unsatisfactory service.

Effect of Open-Window Discussion on Better Building Operation

Already a significant reflex of the open-window discussion is being noted in the attitude of many engineer-custodians of school buildings, who are putting themselves on record in favor of mechanical ventilation. In an article contributed to "The Illinois Chapter" for April by J. T. Fleming, engineer-custodian of the Chicago Board of Education, he states that there is in that city an organization of over 350 ardent advocates of mechanical ventilation and just as many opposed to so-called window ventilation.

Of course, the practical adoption of open-window ventilation methods would relieve the custodian-engineers of at least a part of their responsibilities, with a consequent reduction in pay and, possibly, the employment of a lower grade of men to handle the mechanical equipment in school buildings. To heating engineers, however, the interesting phase in the matter is that the engineer-custodians have been brought face to face with the fact that their future depends upon the quality of the ventilation provided in school buildings and, therefore, it is to their interest to see that the mechanical ventilating systems are operated in accordance with their design.

If the open-window discussion does nothing else than to awaken the engineer-custodians to their duties, it will not have been without its blessings.

Annual Meeting of British Heating Engineers

A PAPER on "Engineering Services in Hospitals and Asylums," by Herbert G. Cathcart, occupied the place of honor on the program of the annual meeting of the Institution of Heating and Ventilating Engineers, held in London, February 10. In the absence of Secretary W. G. Hollingworth, who is slowly convalescing from a long illness, Miss C. Hollingworth acted as secretary pro tem.

The meeting marked the induction into office of the new president, Oswald Stott. Progress reports were presented by the Boiler Rating Committee and the Fan Standardization Committee, but no definite final recommendations were presented.

In connection with the essay competition, Chairman A. A. Jones of the Publicity Committee, spoke of the difficulty of getting the desired quality of essays. In order to make the competition more attractive, the British Commercial Gas Association, it is stated, had offered to swell the prize list by an award of ten guineas for a paper on the use of gas.

ENGINEERING SERVICES IN HOSPITALS AND ASYLUMS

In his paper, Mr. Cathcart placed fuel as first in a discussion of engineering services in an asylum or hospital. In this connection, he offered some useful suggestions for keeping track of the fuel consumed and showed that with records of the calorific value and weight of fuel burned, water evaporated and stoker performances to hand, any inefficiency of plant, labor or material was at once manifest and search for the defect was narrowed, the defects being reduced to one of three:

1. Dirty boilers or defective seatings.
2. Low calorific value of fuel.
3. Bad performance of the stokers.

In dealing with the consumption of fuel in institutions, Mr. Cathcart stated that the lowest consumption occurred in asylums where the average amount of fuel burned was 1.75 tons per occupant per annum. In infectious disease and fever hospitals, the highest consumption of fuel per head occurred, this being due to the fact that all patients were bedridden and suffered from diseases of a serious nature. Also, the number of the resident staff was greater, ward services being in operation day and night, so that fuel consumption was continuous.

The average total fuel consumption in hospitals was approximately 4.35 tons per head per annum. The figures for sanitaria for early stages of tuberculosis and those for advanced stages, mostly bedridden, were 2.5 tons per annum and 4.92 tons, respectively. The consumption of fuel in children's hospitals, even mainly with non-pulmonary tuberculosis, glandular diseases, ophthalmia, the majority bedridden, averaged 2.8 tons per head. In children's hospitals, where a considerable amount of open-air treatment was practiced, the fuel consumption per head was lower, being 1.45 tons per head per annum.

This analysis of fuel consumption, Mr. Cathcart showed, provided a strong case for the elimination of all scattered fuel-consuming and stoking points in large institutions and in the design of the engineering plants of large hospitals and asylums, where every effort should be made to centralize the whole from the fuel-consuming apparatus.

HOT WATER FAVORED FOR HOSPITALS AND ASYLUMS

Mr. Cathcart said that for uniformity and consistently reliable service in hospital and asylum work, no heating system could compare with low-pressure hot water. Steam apparatus, he said, has proved unsuitable in a hospital or asylum work, as it appeared to have a bad effect on the patients' throats. Where exhaust steam was available, it was preferable, he said, to pass such steam into a calorifier and use it for heating the low-pressure hot water.

Heating apparatus in hospital wards should be designed to maintain an internal temperature of 65° F. when the external temperature was 30° F. The heating surface installed in operating rooms and sterilizing rooms, he pointed out, should be sufficient to allow the rapid heating up of the compartment to a temperature of 70° F. as, in most cases, the operating theatre was required on short notice. It was sound practice, he urged, to install hinged radiators in operating theatres, as cleaning and sterilizing purposes were of vital importance.

It appears that the general practice in vogue some years ago was to install radiators only in the corridors of the staff's sleeping quarters. Such practice, however, he felt was unsatisfactory and did not prevent the walls of tubicles, streaming with moisture after a sudden change of temperature — a condition which was entirely eliminated by installing a single pipe line at floor level in these quarters.

Regarding the matter of steam consumption by calorifiers supplying heating apparatus, Mr. Cathcart offered figures showing that the quantity of steam consumed varied from 0.16 to 0.25 lbs. per square foot of effective heating surface installed, the lower consumption occurring during mild winter weather, while the maximum of 0.25 lbs. occurred during the cold period when the heating apparatus was working at full load.

Automobile Parking Spaces in Building Basements

In a previous issue the practice was reported of providing parking spaces for automobiles in the basements of office buildings. The accompanying views show the details of the arrangements in the Pacific Telegraph and Telephone Building, in San Francisco.

Fig. 1 shows the driveway and, in the distance, the entrance to the parking space. Fig. 2 shows a section of the parking space. The door at the far end leads into a store room, while the sliding door on the right leads into a space where there are elevators on each side. At the extreme right of the photograph can be seen the door and window connected to the room occupied by the drivers of the various cars. Here the men wait until they are needed to drive a car for the various officials of the company.

Fig. 1. Driveway to Basement Parking Space in Pacific Telegraph and Telephone Building, San Francisco

INFILTRATION

Stationary Wood Sash	25	French Doors	100
Double Hung Wood Sash	50	Outside Doors	200
Double Hung Steel Sash	100	Outside Doors with Storm Doors	100
Casement Windows	100	Outside Doors with Inner Vestibule Doors	100
Fenestra	100		

Metal Weather Strip Deducts 50%

HEATING AND PIPING CONTRACTORS NA

STANDARD RADIATION ESTIMAT

SHOWING RADIATION REQUIRED FOR QUANT

Copyright 1924, by Heating and Piping Contractors National Association. For Other Construction than that Shown S

3 Col 38" St'm Rad	GLASS		INFILTRATION				OUTSIDE WALLS																	
	Win. or Door	Sky Light	Rate per Lin. Ft.				Plain Brick			Brick and Pl.			Brick Fur. L. P.			Br. 4" Tile Pl.			Plain Conc.			Conc. Fur L. P.		
			25	50	100	200	8"	12"	16"	8"	12"	16"	8"	12"	16"	4"	8"	12"	8"	12"	16"	8"	12"	16"
	1.1	1.3	0.45	0.9	1.8	3.6	.42	.32	.26	.38	29	.25	.27	.23	.21	.30	.26	.22	60	.48	.41	.50	.40	.34
225	60.5	71.5	25.0	50.0	100	200	23.1	17.6	14.3	20.9	16.0	13.8	14.9	12.7	11.6	16.5	14.3	12.1	33.0	26.4	22.6	27.5	22.0	18.7
1	3.72	3.15	9.0	4.5	2.25	1.125	9.7	12.8	15.7	10.8	14.1	16.3	15.1	17.7	19.4	13.6	15.7	18.6	6.8	8.5	10.0	8.2	10.2	12.0
2	7.44	6.30	18.0	9.0	4.50	2.25	19.4	25.6	31.4	21.6	28.2	32.6	30.2	35.4	38.8	27.2	31.4	37.2	13.6	17.0	20.0	16.4	20.4	24.0
3	11.2	9.45	27.0	13.5	6.75	3.38	29.1	38.4	47.1	32.4	42.3	48.9	45.3	53.1	58.2	40.8	47.1	55.8	20.4	25.5	30.0	24.6	30.6	36.0
4	14.9	12.6	36.0	18.0	9.00	4.50	38.8	51.2	62.8	43.2	56.4	65.2	60.4	70.8	77.6	54.4	62.8	74.4	27.2	34.0	40.0	32.8	40.8	48.0
5	18.6	15.8	45.0	22.5	11.3	5.63	48.5	64.0	78.5	54.0	70.5	81.5	75.5	88.5	97.0	68.0	78.5	93.0	34.0	42.5	50.0	41.0	51.0	60.0
6	22.3	18.9	54.0	27.0	13.5	6.75	58.2	76.8	94.2	64.8	84.6	97.8	90.6	106	116	81.6	94.2	112	40.8	51.0	60.0	49.2	61.2	72.0
7	26.0	22.1	63.0	31.5	15.8	7.88	67.9	89.6	110	75.6	98.7	114	106	124	136	95.2	110	130	47.6	59.5	70.0	57.4	71.4	84.0
8	29.8	25.2	72.0	36.0	18.0	9.00	77.6	102	126	86.4	113	130	121	142	155	109	126	149	54.4	68.0	80.0	65.6	81.6	96.0
9	33.5	28.3	81.0	40.5	20.2	10.1	87.3	115	141	97.2	127	147	136	159	175	122	141	167	61.2	76.5	90.0	73.8	91.8	108
10	37.2	31.5	90.0	45.0	22.5	11.3	97.0	128	157	108	141	163	151	177	194	136	157	186	68.0	85.0	100	82.0	102	120
11	40.9	34.7	99.0	49.5	24.8	12.4	107	141	173	119	155	179	166	195	213	150	173	205	74.8	93.5	110	90.2	112	132
12	44.6	37.9	108	54.0	27.0	13.5	116	154	188	130	169	196	181	212	233	163	188	223	81.6	102	120	98.4	122	144
13	48.4	41.0	117	58.5	29.2	14.6	126	166	204	140	183	212	196	230	252	177	204	242	88.4	111	130	107	133	156
14	52.1	44.1	126	63.0	31.5	15.8	136	179	220	151	197	228	211	248	272	190	220	260	95.2	119	140	115	143	168
15	55.8	47.2	135	67.5	33.7	16.9	146	192	236	162	212	245	227	266	291	204	236	279	102	128	150	123	153	180
16	59.5	50.4	144	72.0	36.0	18.0	155	205	251	173	226	261	242	283	310	218	251	298	109	136	160	131	163	192
17	63.2	53.5	153	76.5	38.2	19.1	165	218	267	184	240	277	257	301	330	231	267	316	116	145	170	139	173	204
18	67.0	56.7	162	81.0	40.5	20.3	175	230	283	194	254	293	272	319	349	245	283	335	122	153	180	148	184	216
19	70.7	59.9	171	85.5	42.8	21.4	184	243	298	205	268	310	287	336	369	258	298	353	129	162	190	156	194	228
20	74.4	63.0	180	90.0	45.0	22.5	194	256	314	216	282	326	302	354	388	272	314	372	136	170	200	164	204	240
21	78.1	66.1	189	94.5	47.2	23.6	204	269	330	227	296	342	317	372	407	286	330	391	143	179	210	172	214	252
22	81.8	69.3	198	99.0	49.5	24.8	213	282	345	238	310	359	332	389	427	299	345	409	150	187	220	180	224	264
23	85.6	72.4	207	104	51.8	25.9	223	294	361	248	324	375	347	407	446	313	361	428	156	196	230	189	235	276
24	89.3	75.7	216	108	54.0	27.0	233	307	377	259	338	391	362	425	466	326	377	446	163	204	240	197	245	288
25	93.0	78.8	225	113	56.2	28.1	243	320	393	270	353	408	378	443	485	340	393	465	170	213	250	205	255	300

For Methods of Using Table See Back of Sheet.

INFILTRATION

Stationary Wood Sash	25	French Doors	100
Double Hung Wood Sash	50	Outside Doors	200
Double Hung Steel Sash	100	Outside Doors with Storm Doors	100
Casement Windows	100	Outside Doors with Inner Vestibule Doors	100
Fenestra	100		

Metal Weather Strip Deducts 50%

HEATING AND PIPING CONTRACTORS NA

STANDARD RADIATION ESTIMAT

SHOWING RADIATION REQUIRED FOR QUANT

Copyright 1924, by Heating and Piping Con tractors National Association. For Other Construction than that Shown

3 Col 38" St'm Rad	GLASS		INFILTRATION				OUTSIDE WALLS																	
	Win. or Door	Sky Light	Rate per Lin. Ft.				Plain Brick			Brick and Pl.			Brick Fur. L. P.			Br. 4" Tile Pl.			Plain Conc.			Conc. Fur L. P.		
			25	50	100	200	8"	12"	16"	8"	12"	16"	8"	12"	16"	4"	8"	12"	8"	12"	16"	8"	12"	16"
	1.1	1.3	0 45	0.9	1.8	3 6	.42	.32	.26	38	.29	.25	.27	.23	.21	.30	.26	.22	60	.48	.41	.50	.40	.34
225	22.0	26.0	9.0	18.0	3.6	7.2	8.4	6.4	5.2	7.6	5.8	5.0	5.4	4.6	4.2	6.0	5.2	4.4	12.0	9.6	8.2	10.0	8.0	6.8
1	10.2	8.65	25.0	12.5	6.25	3.13	26.8	35.2	43.3	29.6	38.8	45.0	41.8	49.0	53.6	37.5	43.3	51.2	18.7	23.4	27.4	22.5	28.2	33.2
2	20.4	17.3	50.0	25.0	12.5	6.26	53.6	70.4	86.6	59.2	77.6	90.0	83.6	98.0	107	75.0	86.6	102	37.4	46.8	54.8	45.0	56.2	66.4
3	30.6	25.9	75.0	37.5	18.7	9.39	80.4	106	130	88.8	116	135	125	147	161	113	130	154	56.1	70.2	82.2	67.5	84.3	99.6
4	40.8	34.6	100	50.0	25.0	12.5	107	141	173	118	155	180	167	196	214	150	173	205	74.8	93.6	110	90.0	112	133
5	51.0	43.2	125	62.5	31.3	15.6	134	176	216	148	194	225	209	245	268	188	216	256	93.5	117	137	112	141	166
6	61.2	51.9	150	75.0	37.5	18.7	161	211	260	178	233	270	251	294	322	225	260	307	112	140	164	135	169	199
7	71.4	60.5	175	87.5	43.7	21.8	188	246	303	207	271	315	293	343	375	263	303	358	131	164	192	157	197	232
8	81.6	69.2	200	100	50.0	25.0	214	282	346	237	310	360	334	392	429	300	346	410	150	187	219	180	225	266
9	91.8	77.8	225	112	56.0	28.1	241	317	390	266	349	405	376	441	482	338	390	461	168	211	247	202	253	299
10	102	86.5	250	125	62.5	31.2	268	352	433	296	388	450	418	490	536	375	433	512	187	234	274	225	281	332
11	112	95.1	275	137	68.5	34.3	295	387	476	326	427	495	460	539	590	413	476	563	206	257	301	247	309	365
12	122	103	300	150	75.0	37.5	322	422	520	355	466	540	502	588	643	450	520	614	225	281	329	270	337	398
13	133	112	325	162	81.0	40.6	348	457	563	384	504	585	544	637	696	488	563	666	244	304	356	292	365	432
14	143	121	350	175	87.5	43.7	375	492	606	414	542	630	586	686	750	525	606	717	262	328	384	315	393	465
15	153	129	375	187	93.5	46.8	402	528	650	444	581	675	628	735	804	563	650	768	281	351	412	337	422	498
16	163	138	400	200	100	50.0	429	564	693	474	620	720	669	784	858	600	693	820	300	374	439	360	450	532
17	173	147	425	212	106	53.1	456	598	736	504	659	765	710	833	911	638	736	871	318	398	466	382	478	565
18	184	155	450	225	113	56.3	482	634	780	533	698	810	752	882	964	675	780	922	337	421	494	405	506	598
19	194	164	475	237	119	59.5	509	668	823	562	737	855	794	931	1018	713	823	973	355	445	521	427	534	631
20	204	173	500	250	125	62.6	536	704	866	592	776	900	836	980	1072	750	866	1024	374	468	548	450	562	664
21	214	181	525	262	131	65.7	563	739	910	622	814	945	878	1029	1126	788	910	1076	392	491	576	472	590	698
22	224	190	550	275	137	68.8	590	774	953	651	853	990	920	1078	1179	825	953	1127	411	515	603	495	618	731
23	235	198	575	287	143	71.9	616	810	996	680	892	1035	962	1127	1232	863	996	1178	430	538	630	517	646	764
24	245	207	600	300	150	75.0	643	844	1039	710	931	1080	1004	1176	1286	900	1039	1229	449	562	658	540	674	796
25	255	216	625	312	156	78.1	670	880	1073	740	970	1125	1046	1225	1340	938	1073	1280	467	585	686	562	703	830

TORS NATIONAL ASSOCIATION
ESTIMATING TABLE
FOR QUANTITIES INDICATED

uction than that Shown See Heating and Piping Contractors National Association Engineering Standards.

PHILADELPHIA

TEMPERATURE FACTORS		EXPOSURE FACTORS			
Room Temperature	$70°=T_r$	N	1.20	S	1.00
Base Temperature	$+15°=T_o$	NE	1.10	SW	1.00
Base Temp. +15° Equivalent to		E	1.10	W	1.20
Guarantee Temp. of	0° Outside	SE	1.00	NW	1.20

Conc. Fur L. P. 8"	12"	16"	Frame Std.	Frame No Sh'g	Frame No L. P.	ROOF T&G on 1" Bd.	T&G on 4" Conc.	Sh'gle on Sh'g	Sh'gle Sh'g L. P.	Base Floor Conc. on Earth	Wood on Sleep.	Interm'e Floor 4" Conc.	4" Conc. 3" Fill 1" Fin.	Double Wood	Ceiling Lath and Plas.	L & P Wo. Fl. Over	Partition Stud L & P 1 Side	Stud L & P 2 Side		Type / Kind / Thick. / K / K(Tr-To)
.50	.40	.34	.24	.31	.35	.30	.60	.40	30	.31	13	.20	15	20	49	28	60	33		
27.5	22.0	18.7	13.2	17.1	19.3	16.5	33.0	22.0	16.5	8.55	3.58	5.5	4.13	5.5	13.5	7 7	16.5	9 08		
8.2	10.2	12.0	17.0	13.2	11.7	13.6	6.8	10.2	13.6	26.3	62.9	40.9	54 5	40.9	16 7	29.2	13.6	24 8		1
16.4	20.4	24.0	34.0	26.4	23.4	27.2	13.6	20.4	27.2	52.6	126	81.8	109	81.8	33.4	58.4	27.2	49.6		2
24.6	30.6	36.0	51.0	39.6	35.1	40.8	20.4	30.6	40.8	78.9	189	123	164	123	50.1	87.6	40.8	74.4		3
32.8	40.8	48.0	68.0	52.8	46.8	54.4	27.2	40.8	54.4	105	252	164	218	164	66.8	117	54.4	99.2		4
41.0	51.0	60.0	85.0	66.0	58.5	68.0	34.0	51.0	68.0	132	315	205	273	205	83.5	146	68.0	124		5
49.2	61.2	72.0	102	79.2	70.2	81.6	40.8	61.2	81.6	158	377	245	327	245	100	175	81.6	149		6
57.4	71.4	84.0	119	92.4	81.9	95.2	47.6	71.4	95.2	184	440	286	382	286	117	204	95.2	174		7
65.6	81.6	96.0	136	106	93.6	109	54.4	81.6	109	210	503	327	436	327	134	234	109	198		8
73.8	91.8	108	153	119	105	122	61.2	91.8	122	237	566	368	491	368	150	263	122	223		9
82.0	102	120	170	132	117	136	68.0	102	136	263	629	409	545	409	167	292	136	248		10
90.2	112	132	187	145	129	150	74.8	112	150	289	692	450	600	450	184	321	150	273		11
98.4	122	144	204	158	140	163	81.6	122	163	316	755	491	654	491	200	350	163	298		12
107	133	156	221	172	152	177	88.4	133	177	342	818	532	709	532	217	380	177	322		13
115	143	168	238	185	164	190	95.2	143	190	368	881	573	763	573	234	409	190	347		14
123	153	180	255	198	176	204	102	153	204	395	944	614	818	614	251	438	204	372		15
131	163	192	272	211	187	218	109	163	218	421	1006	654	872	654	267	467	218	397		16
139	173	204	289	224	199	231	116	173	231	447	1069	695	927	695	284	496	231	422		17
148	184	216	306	238	211	245	122	184	245	473	1132	736	981	736	301	526	245	446		18
156	194	228	323	251	222	258	129	194	258	500	1195	777	1036	777	317	555	258	471		19
164	204	240	340	264	234	272	136	204	272	526	1258	818	1090	818	334	584	272	496		20
172	214	252	357	277	246	286	143	214	286	552	1321	859	1145	859	351	613	286	521		21
180	224	264	374	290	257	299	150	224	299	579	1384	900	1199	900	367	642	299	546		22
189	235	276	391	304	269	313	156	235	313	605	1447	941	1254	941	384	672	313	570		23
197	245	288	408	317	281	326	163	245	326	631	1510	982	1308	982	401	701	326	595		24
205	255	300	425	330	293	340	170	255	340	658	1573	1023	1363	1023	418	730	340	620		25

← These Items Figured on Basis of K $\left(\frac{T_r - T_o}{2}\right)$ →

TORS NATIONAL ASSOCIATION
ESTIMATING TABLE
FOR QUANTITIES INDICATED

uction than that Shown SeeHeating and Piping Contractors National Association Engineering Standards.

LOS ANGELES

TEMPERATURE FACTORS		EXPOSURE FACTORS			
Room Temperature	$70°=T_r$	N	1.50	S	1.00
Base Temperature	$+50°=T_o$	NE	1.50	SW	1.00
Base Temp. +50° Equivalent to		E	1.50	W	1.50
Guarantee Temp. of	+35° Outside	SE	1.00	NW	1.50

Conc. Fur L. P. 8"	12"	16"	Frame Std.	Frame No Sh'g	Frame No L. P.	ROOF T&G on 1" Bd.	T&G on 4" Conc.	Sh'gle on Sh'g	Sh'gle Sh'g L. P.	Base Floor Conc. on Earth	Wood on Sleep.	Interm'e Floor 4" Conc.	4" Conc. 3" Fill 1" Fin.	Double Wood	Ceiling Lath and Plas.	L & P Wo. Fl. Over	Partition Stud L & P 1 Side	Stud L & P 2 Side		Type / Kind / Thick. / K / K(Tr-To)
.50	.40	.34	.24	.31	.35	.30	.60	.40	.30	.31	.13	.20	.15	.20	.49	.28	.60	.33		
10.0	8.0	6.8	4.8	6.2	7.0	6.0	12.0	8.0	6.0	3.1	1.3	2.0	1.5	2.0	4.9	2.8	6.0	3.3		
22.5	28.2	33.2	46.8	36.3	32.2	37.5	18.7	28.2	37.5	72.6	173	113	15.0	113	46.0	80.4	37.5	68.2		1
45.0	56.2	66.4	93.6	72.8	64.4	75.0	37.4	56.2	75.0	145	346	225	30.0	225	92.0	161	75.0	136		2
67.5	84.3	99.6	140	109	96.6	113	56.1	84.3	113	218	519	338	45.0	338	138	241	113	205		3
90.0	112	133	187	145	129	150	74.8	112	150	290	692	450	60.0	450	184	322	150	273		4
112	141	166	234	182	161	188	93.5	141	188	363	865	563	75.0	563	230	402	188	341		5
135	169	199	280	218	193	225	112	169	225	436	1038	676	90.0	676	276	482	225	409		6
157	197	232	328	254	225	263	131	197	263	508	1211	789	105	789	322	563	263	477		7
180	225	266	374	292	258	300	150	225	300	581	1384	902	120	902	368	643	300	546		8
202	253	299	422	328	290	338	168	253	338	653	1557	1015	135	1015	414	724	338	614		9
225	281	332	468	364	322	375	187	281	375	726	1730	1128	150	1128	460	804	375	682		10
247	309	365	514	400	354	413	206	309	413	799	1903	1241	165	1241	506	884	413	750		11
270	337	398	561	436	386	450	225	337	450	871	2076	1354	180	1354	552	965	450	818		12
292	365	432	608	473	419	488	244	365	488	944	2249	1467	195	1467	598	1046	488	886		13
315	393	465	655	510	451	525	262	393	525	1016	2422	1580	210	1580	644	1126	525	954		14
337	422	498	702	546	483	563	281	422	563	1090	2595	1693	225	1693	690	1206	563	1024		15
360	450	532	748	582	515	600	300	450	600	1162	2768	1816	240	1816	736	1286	600	1092		16
382	478	565	796	618	547	638	318	478	638	1234	2941	1929	255	1929	782	1367	638	1160		17
405	506	598	842	655	580	675	337	506	675	1306	3114	2042	270	2042	828	1448	675	1228		18
427	534	631	890	692	612	713	355	534	713	1380	3287	2155	285	2155	874	1528	713	1296		19
450	562	664	936	728	644	750	374	562	750	1452	3460	2268	300	2268	920	1608	750	1364		20
472	590	698	982	764	676	788	392	590	788	1524	3633	2381	315	2381	966	1688	788	1432		21
495	618	731	1029	800	708	825	411	618	825	1598	3806	2494	330	2494	1012	1769	825	1500		22
517	646	764	1076	837	741	863	430	646	863	1670	3979	2617	345	2617	1058	1850	863	1570		23
540	674	796	1123	873	773	900	449	674	900	1742	4152	2830	360	2830	1104	1930	900	1636		24
562	703	830	1170	910	805	938	467	703	938	1815	4325	2943	375	2943	1150	2010	938	1704		25

Fig. 2. Section of Automobile Parking Space, Pacific Telegraph and Telephone Building

Fig. 3 shows an air inlet in this waiting room through which fresh air is delivered at a temperature of about 75°. This is sufficient to heat and ventilate the waiting room.

The air passes from the waiting room out into the garage through the window and door. Similar air outlets are provided in the store room and in other rooms in the basement, while suction fans are installed in certain rooms, including the space under the garage.

With the doors of these various departments entering into the garage, a plenum condition is secured which, it is stated, serves to ventilate the garage. Consequently there are no air inlets or exhausts in the garage. Along the wall near the ceiling, at the right, can be seen the air ducts leading to the store room and waiting room.

Gas Company Stages Window Displays to Promote Better Illumination

The importance of arranging properly-illuminated window displays of heating apparatus in a way that will show its construction and operation as clearly as possible is coming to be widely recognized. A notable display of this sort is shown in the accompanying illustration which is that in the show window of the Pacific Gas & Electric Company, in San Francisco. The company's windows, it appears, are turned over to its customers in rotation for the display of each customer's goods. The displays are arranged under the gas company's direction. Special pains have been taken to provide the last word in show-window lighting of high intensity and variety of color, as well as spot lighting and foot lighting.

One of the accompanying photographs shows a Bryant warm-air furnace with the front removed, with placards telling of the basic points of the various features of construction.

In the windows of the Pacific Gas & Electric Company cards accompanying each exhibit explain that the windows are donated to the interest of better illumination, with a view of adding attractiveness and value to the merchandise displayed, to permit closer and more accurate inspection of the goods,

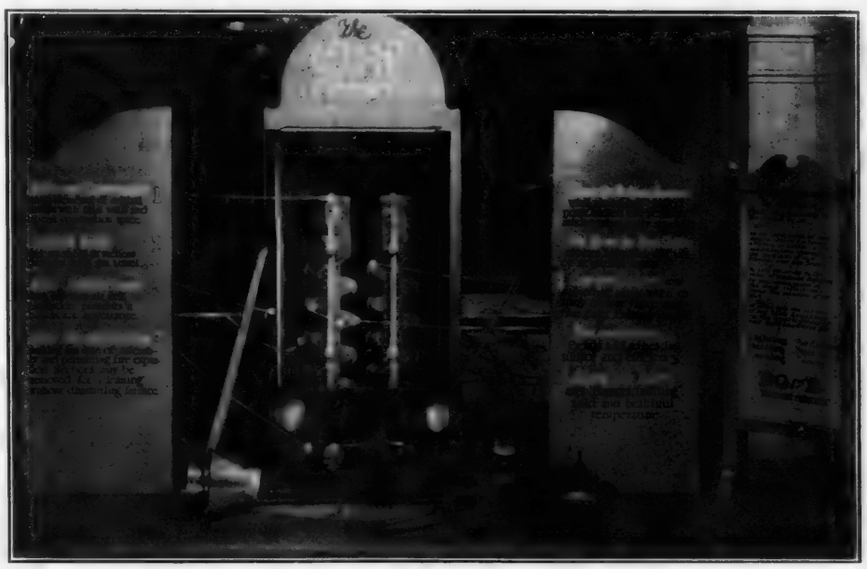
Fig. 3. Air Inlet in Waiting Room

to create a silent salesman after closing hours by serving "window shoppers," and to overcome daylight reflections.

Overcoming reflections in these windows was accomplished by the use of 500-watt lamps on 18-in. centers in X-ray reflectors and housing, mounted on the transom bar at the top of the windows. In addition, 500-watt X-ray floodlighting units, with color mediums, are installed in the corners and in the ceiling in each of the windows. For footlights, X-ray disappearing 100-watt lamps were used, on 6-in. centers. Alternate lamps in the main battery of lamps and also in the footlights are placed on alternate circuits, and each spotlight is controlled separately.

DIVISION OF ENGINEERING AND INDUSTRIAL RESEARCH is a publication issued by the National Research Council in Co-operation With Engineering Foundation. The publication outlines the aims and purposes of the Division of Engineering and Industrial Research which is one of the sections of the National Research Council. The principal activities of this division consist in stimulatin research, and co-ordinating the work of existing agencies.

Its major activities may be divided into two groups, first, promotional, aimed at the stimulation of research generally, and second, the administration of projects of national scope and importance. The first form of activity may again be divided into two parts: First, the general or national program of selling the research idea to industrial executives generally, and bringing about an appreciation of the value of research to the public. The second part includes the specific promotional effort directed to certain industries or corporations which have recognized the necessary for research. The booklet goes on to detail the lines along which it is proposed to follow, and several specific cases are cited indicating the tremendous benefit to the nation that may result from the carrying out of this plan. The book may be had upon application to the Engineering Foundation.



Special Illumination of Window Display in Show Window of Pacific Gas and Electric Company, San Francisco

New York State Heating Contractors Back Certified Heating

A CONCERTED movement to secure the State-wide adoption of certified heating was set on foot at the annual meeting of the Heating and Piping Contractors New York State Association in Utica, March 29. The matter came up in the report of E. H. Monif, chairman of the Association Improvement Committee, who in his report recommended certified heating and a drive throughout the State to increase the membership.

The advantages of certified heating were stressed in an address by Walter L. Fleisher, vice-president of the Cooling and Air Conditioning Corporation of New York and chairman of the national association's Standardization Committee.

"Certified heating," said Mr. Fleisher, "is the guarantee by a group of responsible people or surety companies or a bonded group that the work installed by an individual is proper and adequate for the purpose for which it is intended and the individuals subscribing to the purposes and objects of this group bind themselves to follow the formulae and quantities laid down by the collective membership."

Mr. Fleisher told how the plan is being successfully followed in Chicago, Memphis, Tenn., St. Louis, Brooklyn, N. Y., and Boston.

In answer to the argument that the plan might tend to eliminate the contractor's advantage in competition, due to the fact that the buyer knows he will get a satisfactory job from any member of the group, Mr. Fleisher stated that "certified heating fixes only minimum results, and maximum efficiency of a heating plant depends, as usual, on a contractor's ability."

He showed how the correct rating of boilers is a part of the standardization and certified heating program. He expressed his conviction that certified heating is the guarantee of the future of the master steamfitter's business. Standardization work in the association, he stated, was started to remove guesswork when figuring radiation. As the work progressed, the committee divided its task into figuring radiation, standards for valves and fittings, boiler ratings and standards for other equipment. The committee finally decided upon a radiation estimating formula, which is embodied in its "Engineering Standards" and radiation estimating tables. (These tables are now appearing in serial form in THE HEATING AND VENTILATING MAGAZINE.)

Mr. Fleisher stated that by the time of the meeting of the national association, in June, the committee hoped to have ready standards for pipe sizes. This work, with the standardization of chimney design and construction, will provide a complete set of standards on all the important factors in the heating industry.

One point raised in the discussion as to whether the certified heating plan did not make knowledge available for those who had not worked for it was promptly answered by Mr. Fleisher in the statement that lack of knowledge had never kept a competitor out of business.

The new officers of the association, elected at the meeting, are: President, William G. Fraser, Buffalo; vice-president, William J. Olvany, New York; treasurer, Robert E. Miller, New York. Board of Directors: Edward B. Folley, Binghamton; Martin W. Utz, Rochester; Carl W. Schneider, the retiring president, Utica, and A. B. Tompkins, Buffalo.

J. C. Fitts, of the national association headquarters, acted as secretary in the absence, due to illness, of Secretary Henry B. Gombers.

Changes in Staff at Heating Contractors' Headquarters

Due to the larger membership and a more comprehensive program of standardization and to the growth of the association's *Official Bulletin*, the board of directors, at its last meeting in March, appointed Joseph C. Fitts, of New York, to be associate editor of the *Official Bulletin* and secretary of the Committee on Standardization and freed him from his other duties so as to be able to devote his entire attention to this work. The duties of assistant to the secretary were taken over by Robert W. Bunten of New York, who recently joined the headquarters staff.

Steamfitters' Wages in Typical American Cities

In connection with the recent steamfitters' strike in New York City, the Heating and Piping Contractors New York Association, in a statement as to why the present strike of steamfitters and steamfitters' helpers is not justified, quotes from a survey of the wages of steamfitters and their helpers throughout the United States to prove that only in New York does the helper enjoy his relation of over 76%, which has existed since December 31, 1923. The survey shows that in eighteen of the important cities, the helper's wage is 68½% of the steamfitters' wage. In those cities paying $12 for a steamfitter, only two cities pay as much as $7 to the helper, or 58-1/3%. The association goes on record as offering to pay $12.00 a day to the steamfitter and $8.00 a day to the steamfitter's helper. This would maintain a ratio of 66-2/3% for the helper's wage.

In support of the association's offer, the figures for the eighteen cities cited are included as follows:

PRESENT WAGE IN THE UNITED STATES OF STEAMFITTERS AND STEAMFITTERS' HELPERS

	Steamfitter	Helper	Percent
Erie	$10.00	$4.00	40.
Houston	12.00	5.00	41.6
Louisville	11.00	4.80	43.6
Memphis	10.54	5.00	47.4
Cleveland	12.00	6.00	50.
Des Moines	10.00	5.20	52.
St. Joseph	10.00	5.20	52.
Kansas City	11.00	6.00	54.5
Detroit	10.00	5.60	56.
Pittsburg	12.00	7.00	58.3
St. Louis	12.00	7.00	58.3
Indianapolis	10.80	6.40	59.2
Cincinnati	10.00	6.00	60.
Portland, Ore.	10.00	6.00	60.
Washington, D. C.	11.00	6.80	61.8
Boston	10.00	6.40	64.
Baltimore	10.00	6.40	64.
Denver	9.50	6.50	68.4
Newark	11.00	8.00	72.7
New York	10.50	8.00	76.1
Chicago Steamfitters	$12.00	Apprentices up to	$6.80

WAGES PAID IN NEW YORK CITY

Year			
1890	$3.50	$2.00	57.1
1897	3.75	2.00	54.
1900	4.00	2.30	57.5
1903	4.50	2.65	58.8
1906	5.00	3.00	60.
1910	5.50	3.00	54.5
1917 April	5.50	3.20	58.1
1917 August	6.00	3.40	56.6
1917 October	7.00	*4.50	64.2
1920 January	8.00	6.00	75.
1920 May	9.00	7.00	77.7
1923	10.00	8.00	80.
1924	10.50	8.00	76.1
1926 (sug't'd wage).	12.00	8.00	66.6

*Helper's wage granted voluntarily by employer establishing a standard relation of 64.2%.

CERTIFIED HEATING, What It Is, is the subject of a folder issued by the Chicago Master Steamfitters' Association, Chicago, Ill. Certified heating is described as the registered trade name of heating systems installed in bungalows, residences, two and three story apartments by members of the Chicago Master Steamfitters' Association in accordance with its published standards. These standards, it is stated, are now in the official handbook of the Illinois Society of Architects. On the last page of the folder are given some 140 firms, members of the Chicago Master Steamfitters' Association which can supply certified heating.

A BIBLIOGRAPHY ON RESEARCH, containing selected articles from the technical press for 1923, 1924 and 1925, has been issued by the National Research Council, Division of Engineering and Industrial Research, 29 West 39th St., New York. It is described as the most complete survey of current articles on research yet published. Fuels, including coal, petroleum and gas, are covered by nearly 100 references, while the references on the subject of heating and ventilation include those on the work of the A.S.H. & V.E. Research Laboratory and the Heating Research Residence of the National Warm-Air Heating and Ventilating Association. Under general research, the references cover research in industry, research in laboratories, research in universities and the general value of research. Size 6 x 9 in. Pp. 46.

University of Illinois to Undertake Research Work in Steam and Water Heating

THE University of Illinois has just signed a co-operative agreement under which the Engineering Experiment Station of the university will undertake an investigation of steam and water heating systems. The co-operating agencies are the National Boiler and Radiator Manufacturers' Association and the Illinois Master Plumbers' Association, which will provide the funds ($6,000 per year) for the prosecution of the work to be done here at the university.

The Illinois Master Plumbers' Association was the originator of the idea and decided to offer $3,000 a year for the investigation. The National Boiler and Radiator Manufacturers' Association also offered $3,000, so the aggregate appropriations from these organizations will be $6,000 a year. The agreement has been made for one year, and probably will be renewed the following two years.

The terms of the agreement under which this work will be done are quite similar in character to those relating to the warm-air furnace heating investigation which has been in progress at the university since 1918. The university will furnish the necessary room, heat, light, power, and water for the investigation, and also will permit the use of such laboratory apparatus as may be available.

The university will reserve all rights of publication. The Engineering Experiment Station will supervise and direct all experimental work, compute the results, and publish a bulletin of the results. All records of the investigation will be kept as property of the university and will be on file at the Engineering Experiment Station.

The investigation will be under the general direction of Dean Milo S. Ketchum of the College of Engineering, who is also director of the Engineering Experiment Station. The work will be done by the research staff of the Department of Mechanical Engineering, under the personal supervision of Professor A. C. Willard, head of the department, and professor of heating and ventilation.

The work will be of a decidedly original character, such as taking a practical problem, analyzing it to get at the underlying technical fundamentals, establishing the character of these fundamental factors by actual test, analyzing the data and preparing a report of the findings. Such reports are later usually incorporated into material for one or more bulletins of the Engineering Experiment Station.

The results obtained should be of direct value to the designer and installer of steam and water heating systems, as well as to the owners of buildings equipped with such systems.

Philadelphia Home Heating Show Postponed

Due to a number of factors including the pending organization of an oil-burner association in Philadelphia, the plans being made for the Sesqui-Centennial Exposition and the desire to secure as representative a demonstration as possible, it is announced that the second annual Home Heating and Appliance Show of Philadelphia, scheduled for April 26 to May 1, has been postponed indefinitely.

Chicago Organizations Co-operate in Compiling New Ventilation Code

Nine organizations in the Chicago building field, including the Illinois Chapter of the American Society of Heating and Ventilating Engineers, the Ventilating Contractors' Association and the Chicago Master Steamfitters' Association met March 8, at the City Club, with the Chicago Association of Consulting Engineers, to discuss Chicago's ventilation needs, with special reference to the city's proposed new ventilation code. The meeting was called to order by James P. Lund, who is chairman of the Ventilating Committee of the Illinois Chapter. Mr. Lund presented H. M. Hart, representative of the Chicago Master Steamfitters' Association, as chairman for the evening.

Before retiring from the chair, Mr. Lund stated that one of the objects of the meeting was to advise the Health Department that it has the co-operation of all the representative organizations in the city in the formation of the proposed new Chicago ventilating code.

Representatives of the Health Department, who were present, stated that steps are now being taken either to revise the present code and bring it up to date or to compile a new code.

The Forthcoming First American Health Congress

Plans for the American Health Congress, to be held at Atlantic City, May 17-22, show promise that it will be one of the most brilliant advances in the public health movement in this country in a decade. For the first time the organizations making up the National Health Council will be brought together in a common gathering to observe the advance in their work since the formation of the National Health Council five years ago.

Four general sessions will be held, to discuss common interests and problems concerning the public health. Sir Arthur Newsholme, K.C.B., M.D., F.R.C.P.—whose dream of the Ministry of Health, and its realization form the keynote of the public health history of Great Britain during the past forty years,—will address the first session.

Among the principal speakers of the second session is Professor C.-E. A. Winslow, noted exponent of the open-air window ventilating system for public schools and president of the American Public Health Association. Dr. Ray Lyman Wilbur, president of Stanford University, will speak at the third session on the subject of—"Is Public Health Improving the Race?" Other prominent speakers to be heard will include Dr. George E. Vincent, president of the Rockefeller Foundation, and Dr. Alice Hamilton, assistant professor of industrial medicine, Harvard Medical School.

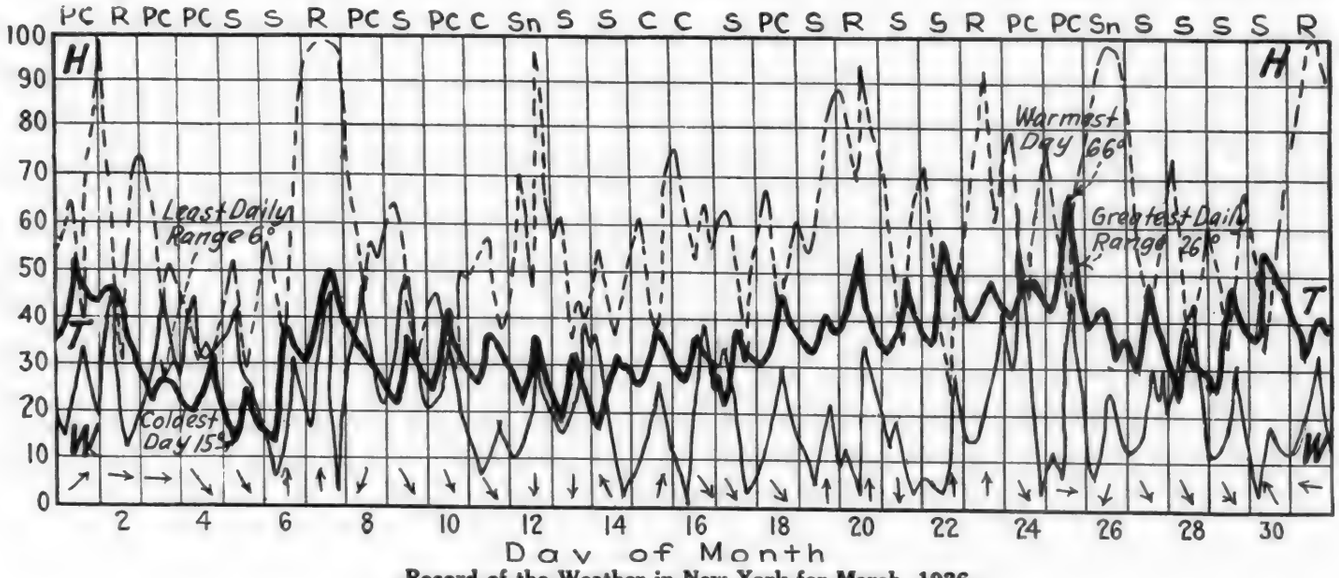
Hoist on Motor Car for Handling Heavy Pipe

How heavy pipe is handled by a hoist operated in connection with a crane attached to the front of a low-bed trailer is shown in the accompanying illustration, indicating the way it is done on the Pacific Coast. By this means, heavy pipe may be loaded and unloaded with ease and dispatch.

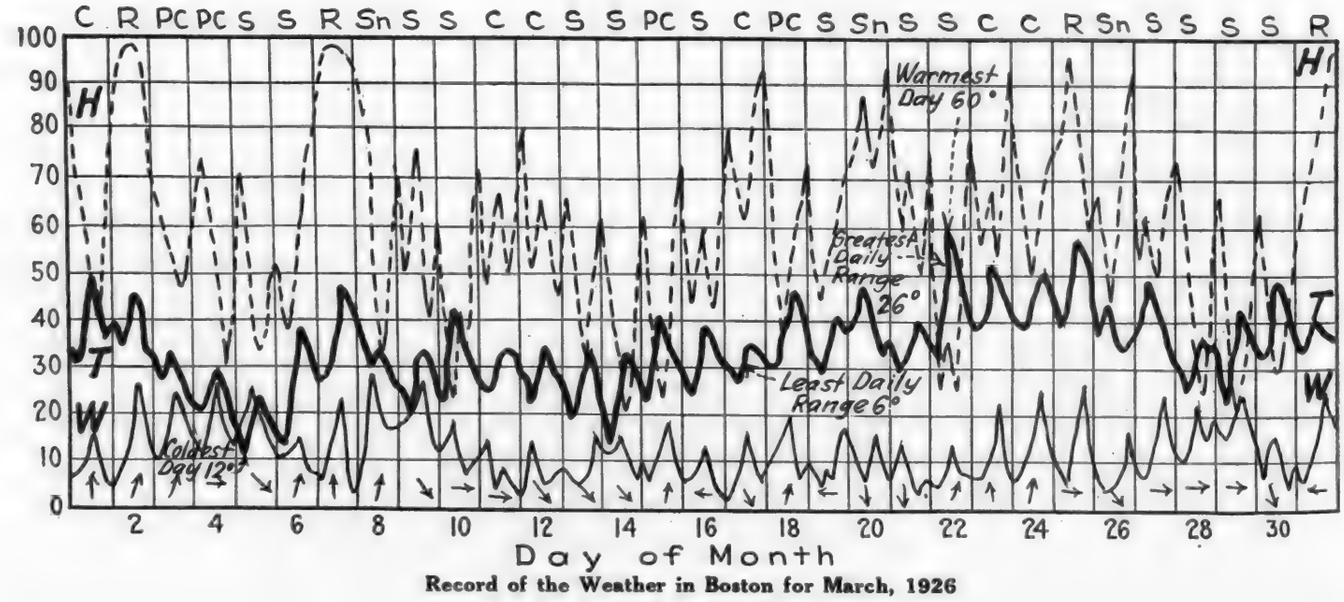
Motor Car Equipped with Hoist for Handling Heavy Pipe

The Weather for March, 1926

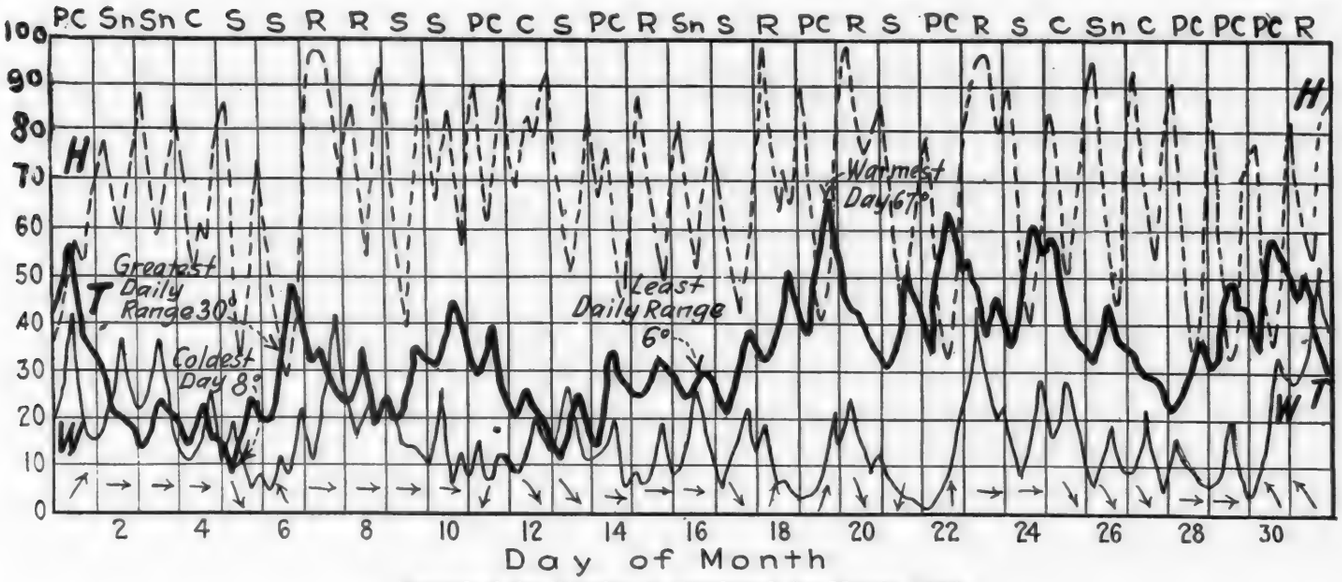
	New York	Boston	Pittsburgh	Chicago	St. Louis
Highest temperature, deg F	66	60	67	71	80
Date of highest temperature	25	22	19	24	24
Lowest temperature, deg. F	13	12	8	9	15
Date of lowest temperature	5	5	5	8	30
Greatest daily range, deg. F	26	26	30	30	32
Date of greatest daily range	25	22	6	24	17
Least daily range, deg. F	6	6	6	4	5
Date of least daily range	3	17	16	4	30
Mean temperature for month, deg. F	35.1	34.2	34.0	30.2	39.6
Normal mean temp. for month, deg. F	37.7	35.5	39.6	35.3	44.2
Total precipitation, this month, in	2.52	2.91	1.7	3.14	3.95
Total snowfall this month, in	1.2	2.8	2.8	2.31	2.1
Normal precipitation, this month, in	4.1	4.08	3.01	2.55	3.43
Total wind movement, this month, miles	14999	8215	10351	10390	10930
Average hourly wind velocity, miles	20.2	11.0	13.9	14.0	14.7
Prevailing direction of wind	N.W.	W.	W.	N.W.	N.W.
Number of clear days	11	14	8	6	10
Number of partly cloudly days	12	8	7	10	10
Number of cloudy days	8	9	16	15	11
Number of days with precipitation	8	8	13	12	11
Number of days with snow	3	5	7	12	5
Snow on ground at end of month, in	None	None	None	8.5	1.5



Record of the Weather in New York for March, 1926
(Hourly observations of the Relative Humidity Plotted on this Chart)



Record of the Weather in Boston for March, 1926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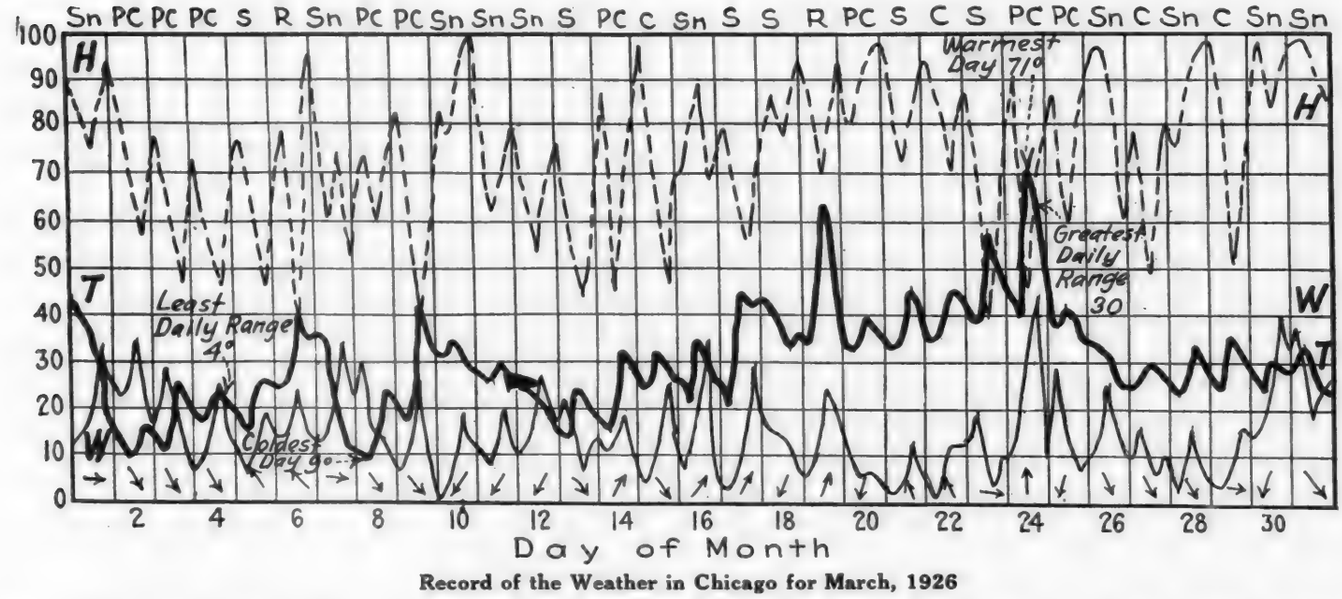
Greatest Daily Range 30°
Coldest Day 8°
Least Daily Range 6°
Warmest Day 67°
Day of Month

Record of the Weather in Pittsburgh for March, 1926


Sn PC PC PC S R Sn PC PC Sn Sn Sn S PC C Sn S S R PC S C S PC PC Sn C Sn C Sn Sn
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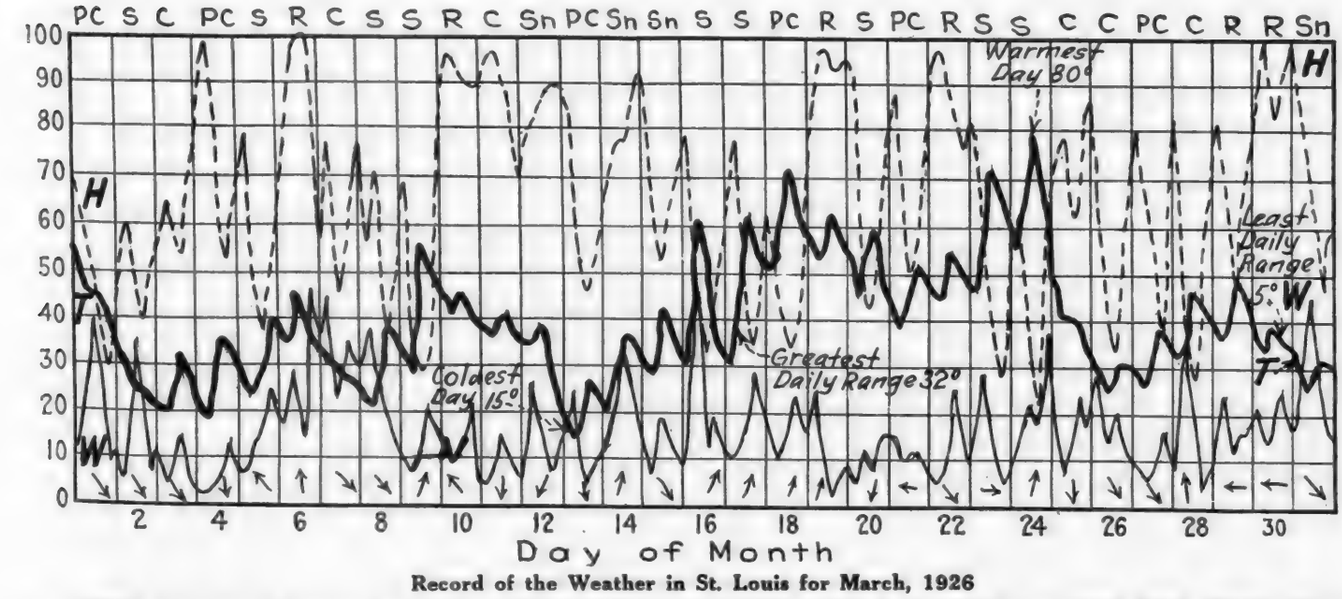
Warmest Day 71°
Least Daily Range 4°
Coldest Day 9°
Greatest Daily Range 30
Day of Month

Record of the Weather in Chicago for March, 1926


PC S C PC S R C S S R C Sn PC Sn Sn S S PC R S PC R S S C C PC C R R Sn
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Warmest Day 80°
Least Daily Range 5°
Coldest Day 15°
Greatest Daily Range 32°
Day of Month

Record of the Weather in St. Louis for March, 1926

Plotted from records especially compiled for THE HEATING AND VENTILATING MAGAZINE by the United States Weather Bureau.
Heavy lines indicate temperatures in degrees F. Light lines indicate wind in miles per hour.
Broken lines indicate humidity in percentage from readings at 8 A. M., 12 M., and 8 P. M.
S—Clear, PC—Partly Cloudy, C—Cloudy, R—Rain, Sn.—Snow. Arrows fly with prevailing directions of wind.

Correspondence

Piping Connections to Tank Heaters

EDITOR HEATING AND VENTILATING MAGAZINE:

In your April issue one of the letters in your Correspondence Department asks about the best and most economical method of installing a water heater for domestic use, utilizing gas as a fuel. I wish to take issue with the method suggested in answer to his question, as that represents practice which is no longer followed in this work. I am enclosing with this letter two sketches (Figs. 1 and 2) showing the present methods of connecting up range boiler equipment.

At a meeting held in October, 1923, in Washington, there were representatives of the range-boiler manufacturers, water heater manufacturers, the American Gas Association, and the Master Plumbers' Association, who suggested that the number of sizes of range boilers be reduced in order to effect economies in manufacture. This was a part of the program of the Division of Simplified Practice, U. S. Department of Commerce. After some discussion, the meeting came to the conclusion that thirteen sizes of range boiler would be quite adequate, and during the discussion it was brought out that certain improvements could be made in the design of the tappings, so as to yield the best results when connected to a water heater.

At the time it was thought that boilers should have three tappings, one for the cold water at the top of the boiler and the other for the hot water outlet. The third at the bottom of the boiler was the sediment blow-off and the connection for the circulating line to the bottom of the heater. The hot water circulating line was attached to the hot water supply pipe to the fixtures by means of a special fitting termed a non-bypass T, which was designed to make the hot water flow into the range boiler, rather than up into the hot water supply lines.

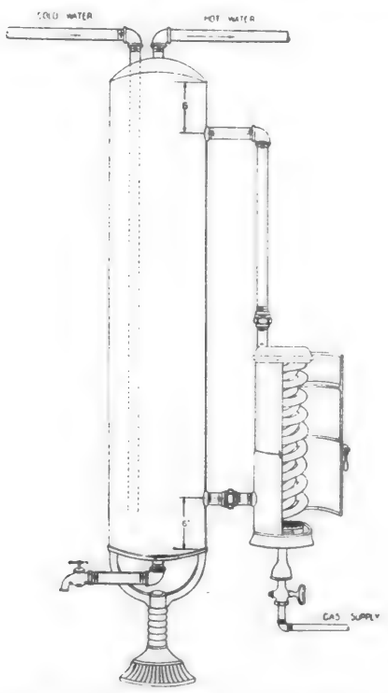


Fig. 1. Proper Connection, Water Heater to Tank Having Two Side Tappings Instead of Old Style Top and Bottom Tappings

Such a connection had several undesirable features. The circulating line from the gas-fired water heater represented a "high point" in the system and, therefore, any dissolved air which might be liberated on heating would collect there. Or, as the pipe rusted up with continued service, some steam might form through overheating and this too would collect on the "high point." As a result, circulation would be definitely impaired and the length of time required to raise hot water would be measurably increased. So much so, that many complaints have been traced to this source, although for a long time the reason for the difficulty remained unknown.

Furthermore, drawing the cold water from the bottom of the tank before bringing it to the heater had the effect of increasing the chances for rusty water, this being another frequently troublesome feature of this connection. The bottom of the boiler served as a sediment and rust collector, so that with a bottom connection to the heater there was a considerable tendency to store up this sediment and to bring it up into the hot water circulation. In order to overcome all these difficulties a new method of connecting range boilers was hit upon. The advantages of these connections were so evident that the range boiler manufacturers universally decided to put them into effect and to-day all range boilers are equipped with five tappings, the three as before and in addition two tappings 6 in. from the top and bottom of the shell used to connect the hot and cold circulating line of the heater respectively.

I am enclosing line drawings (Figs. 1 and 2) showing just how these connections are used. Not only when using a gas-fired water heater, but also in connecting other heating units, such as a laundry heater or coal range water back. The use of these side tappings is now absolutely universal, as all new range boilers are equipped to connect the heaters at these points. They allow free circulation, resulting in relatively large volume hot water storage without overheating. They eliminate short circuiting the water past the heater, and provide ample sediment storage below the circulating line, insuring clean water and a heating element free from sediment.

Obviously, this method reduces the amount of piping required and eliminates the use of the special fitting on top. In connecting the heater it is important to make the circulating pipes between heater and boiler as free from bends and fittings as possible, and to use the largest practical pipe size. The use of brass pipe is recommended, particularly for high temperature circulation. The ends of all circulating pipes should be reamed out before using, and the unions should be placed as close to the heater as possible. If it is desired to make a flue connection, a draft hood, usually known as back draft diverter, should always be installed.

It is a considerable saving to thoroughly jacket the boiler and circulating pipes, but, of course, the heater itself must be left uncovered for the reason that the usual types are lighted by opening the door and if a jacket were placed around the entire heater it would not be possible to do this.

If there is a check valve, reducing valve, or water meter on the cold water supply pipe from the street, an automatic water relief faucet or valve should be installed.

For the horizontal tank there are a number of possibilities, depending upon the size of the system and the various appliances used. I am sending a sketch (Fig. 3) of the more usual method of connecting horizontal tanks. In general, these are only used where the amount

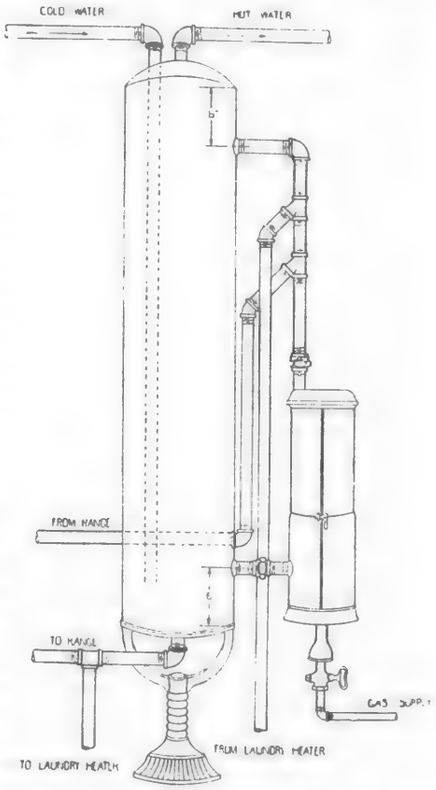


Fig. 2. Proper Connection, Water Heater Kitchen Range Back and Laundry Heater to Tank Having Two Side Tappings

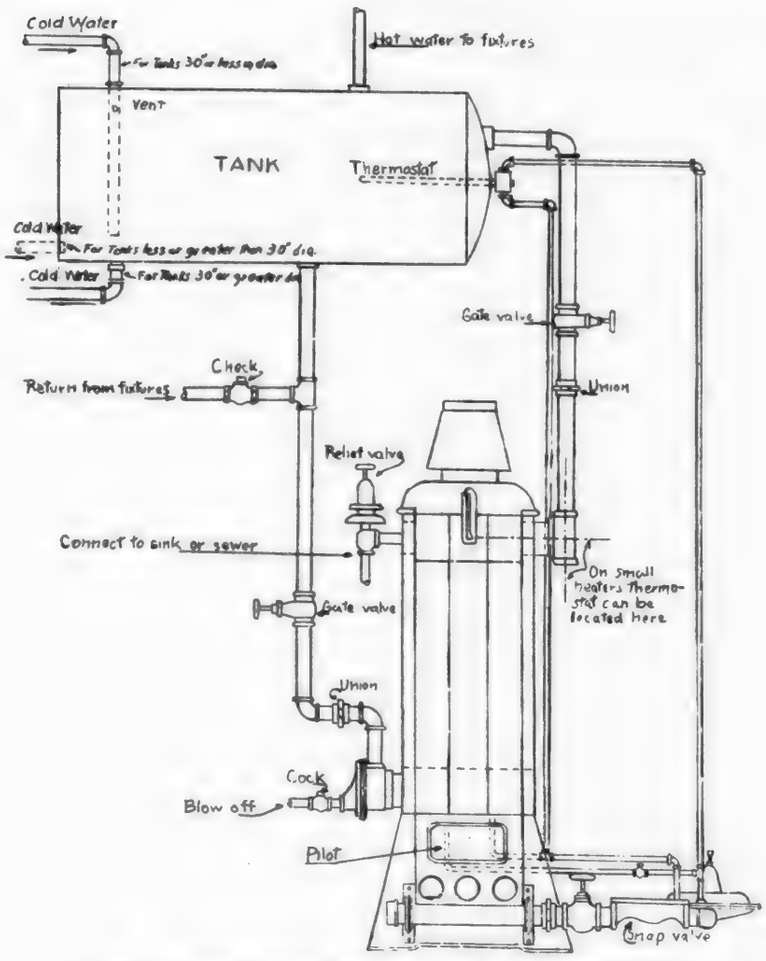


Fig. 3. Usual Method of Connecting Horizontal Tanks

of hot water required is very large, as in apartment houses or industrial buildings.

In closing I might point out a fallacy in the last sentence of the article in the April issue. The use of a low hot water connection about half-way down the tank is for the special purpose of high-speed circulation. This is used in certain types of automatic storage systems in order to provide the quickest possible means of bringing the storage tank back to temperature. The requirements of this system, of course, are different than the manually-operated ones.

C. G. SEGELER,
Industrial Editor,
American Gas Association.

Are the Coal Interests Back of the Open-Window Scare?

EDITOR HEATING AND VENTILATING MAGAZINE:

Is it not likely that the coal interests are back of the open window scare? I happen to own an apartment building in which I supply heat to tenants. Frequently, our Health Department issues a scare-head circular "Open the Windows for Health." I had one family who took the advice and raised my coal consumption a ton a week above normal. I fired that tenant. Coal bills dropped at once a ton a week. Had all tenants taken the crazy doctor's advice, I would save money by closing the building. All tenants use window screens at night without great loss of fuel, but the open windows should be prohibited by law or rents must advance 100%.

Philadelphia, Pa. JOHN GORMLY.

Air Required for Combustion and Air Infiltration in Boiler Rooms

EDITOR HEATING AND VENTILATING MAGAZINE:

Can you tell me the amount of free air required to burn a pound of coal to CO_2?

Also can you tell me if there has ever been any test for infiltration caused by taking the air through the room where the heating unit is located?

Middletown, N. Y. S. H. SANBORN.

Theoretical pounds of air required per pound of fuel, with perfect combustion, is 10.8 for coke, 11.7 for anthracite coal, 11.6 for bituminous coal and 14.3 for oil. These figures are as calculated and would very slightly according to the ultimate analysis of the particular fuel in mind; that is, the amount of carbon, hydrogen, oxygen, nitrogen, sulphur, water and ash which the fuel contains.

In practice, it is impossible to obtain perfect combustion with the theoretical amount of air, and an excess is required, amounting to sometimes double the theoretical supply, depending upon the nature of the fuel to be burned and the method of burning it. The reason for this is that it is impossible to bring each particle of oxygen in the air into intimate contact with the particles in the fuel that are to be oxidized, due not only to the dilution of the oxygen in the air by nitrogen, but because of such factors as the irregular thickness of the fire and the varying resistance to the passage of the air through the fire in separate parts on account of ash, clinkers, etc.

Where the difficulties of drawing air uniformly through a fuel bed are eliminated, as in the case of burning oil fuel or gas, the air supply may be materially less than would be required for coal. Experiment has shown that coal will usually require 50% more than the theoretical net calculated amount of air, or about 18 lbs. (225 cu. ft. if taken at 36° temperature) per pound of fuel, either under natural or forced draft, though this amount may vary widely with the type of furnace, the nature of the coal, and the method of firing. If less than this amount of air is supplied, the carbon burns to monoxide, instead of dioxide and its full heat value is not developed. An excess of air is also a source of waste, as the products of combustion will be diluted and carry off an excessive amount of heat in the chimney gases, or the air will so lower the temperature of the furnace gases as to delay the combustion to an extent that will cause carbon monoxide to pass off unburned from the furnace.

This answers the first question, it being assumed that the correspondent does not refer to free area of grate surface required. The second question refers obviously to a boiler room. In transactions, A.S.H. & V.E., 1924, tests were made for air leakage through windows and other surfaces of buildings for various pressure-differences (down to 0.1 in. of water) between the two sides of the wall. Knowing the draft caused by the chimney it would not be a difficult matter to determine from these data whether or not the necessary air for combustion would be obtained by infiltration.

It should be remembered that the air used for combustion passes out through the stacks and that an equal quantity, therefore must enter the boiler room. In most cases there are a sufficient number of windows or doors leading to other rooms to insure the entrance of the required amount of air, but where large volumes of air are required (due to forced draft under boilers) in tall buildings or steam ships, an air shaft coming down from the outside is required, es-

pecially during the winter months when direct openings to the outside are closed. A case of a tight boiler room comes to mind where the instant the door was opened the slightest bit one could observe the damper regulator start in action so as to automatically close the breeching damper to the extent required by the freer entrance of air to the boiler room. Even the draft caused by the ordinary fireplace is sufficient to open doors which are not closed tightly.

Low Velocity Transmission Data for Copper Heaters

EDITOR HEATING AND VENTILATING MAGAZINE:

Possibly you can obtain the following information for me better than I can do so myself. I understand that Aerofin heaters do not have as high a rate of heat transmission at very low velocities, nevertheless on account of their light weight and condensed size I desire to use it in a gravity indirect heating system.

To cover each case that might arise in gravity work, I would say that a very small table is all that is needed, similar to the others now published, say full data for one to three (at least) rows of tubes deep, velocities 50 to 300 f.p.m., room temperature 70° F., outside temperature ranging from 0 to 50° F., and steam at 5 lbs. pressure.

New York. R. W. T.

Aerofin is designed primarily for use with fan-blast heating systems as the rate of transmission increases very materially with the increase of air velocities over the tubes. With a velocity equivalent to 1000 f.p.m. free area velocity over cast-iron surfaces, the transmission of Aerofin per foot is slightly higher than that for cast-iron and will increase in efficiency over the cast-iron surface with higher air velocities. Likewise, the efficiency is slightly below that of cast-iron for very low air velocities, such as in gravity indirect work.

The following table furnished by the Aerofin Corporation gives the temperature rises which may be expected under the given conditions:

Entering Air Temp., Deg. F.	Number of Rows of Tubes Deep	60′ per min. Face velocity Final temp., Deg. F.	75′ per min. Face velocity Final temp., Deg. F.	100′ per min. Face velocity Final temp., Deg. F.	200′ per min. Face velocity Final temp., Deg. F.
0	1	52	51	46	42
	2	88	86	83	76
	3	117	115	112	105
20	1	64	62	60	58
	2	96	95	94	90
	3	123	122	120	115
40	1	78	77	76	75
	2	108	107	106	104
	3	130	129	128	126
60	1	94	93	92	90
	2	122	121	119	115
	3	139	138	137	134
70	1	103	102	101	99
	2	127	126	125	122
	3	143	142	141	139

Size of Boiler Required for a 12-Hour Run

EDITOR HEATING AND VENTILATING MAGAZINE:

How do I figure the size of boiler required for a 12-hr. run, instead of an 8-hr. run?

Paterson, N. J. K. J.

If you have a boiler rated at 900 sq. ft. for 8-hr. firing periods it would only be good for 600 sq. ft. at 12-hr. firing periods, as its rate of combustion is then only two-thirds of what it was at 8-hr. periods, thus, $8/12 \times 900 = 600$. The same amount of coal is burned in 12 hrs. as in 8 hrs., as the fuel pot will only hold so much coal. This means that the boiler will only deliver two-thirds as much heat, so if you expect to do as much heating the boiler must be 50% larger. For example, if your heating load requires a boiler rated at 600 sq. ft. at 8-hr. firing periods and the boiler is to be fired only once in 12-hrs. you would select a boiler rated by the same manufacturer for 900 sq. ft.

Home Builders' Clinic in Chicago

A unique service for the man who wants to build has been established in Chicago by the Architects' Small House Service Bureau in co-operation with the Art Institute of Chicago and the *Chicago Daily News*. As a feature of this service, every Saturday morning during the building season, the *Daily News* publishes a special page entitled, "The Home Builders' Clinic." The page contains the plans and description of a model home, a question and answer department and articles discussing all phases of home building. In addition, it is stated that complete building plans for any selected home may be obtained at a nominal cost.

Besides the material published in the *Daily News*, a series of meetings was held recently in Fullerton Hall, the Art Institute of Chicago, at which speakers on various phases of home construction were the speakers.

The Architects' Small House Service, which is controlled by the American Institute of Architects, maintains an office in Chicago at 7 West Madison Street. Allen E. Erickson, who is an architect, is director of service.

Plans for the Second National Heating and Ventilating Exposition

Encouraged by the interest shown in the First National Heating and Ventilating Exposition, which was held in the New Madison Square Garden, New York, last March, the promoters of the show have already arranged for the second national exposition and have engaged the Twelfth Regiment Armory, at 61st and 62nd Streets and Columbus Avenue, New York, for that purpose. The dates selected are March 14-21, 1927.

The same association of allied heating and ventilating exhibitors will guide next year's show and the personnel of the committee will be enlarged to include all of the leading factors in the industry.

At a special meeting of the Council of the American Society of Heating and Ventilating Engineers, held April 9, the council went on record as endorsing the plans for the next exposition and expressed its intention of participating actively in the arrangements for the show.

Already, it is stated, many of the exhibitors at the first show have reserved space for next year's exposition and, in a number of cases, have increased their spaces.

The Armory is surrounded on all sides by a balcony which will afford many opportunities to the exposition managers to increase the attractiveness of the show. Reservations for space are being taken by the National Exposition Co., Inc., Suite 334, Hotel McAlpin, Broadway and 34th Street, New York.

Ozone Equipment for the Castle and Cook Building in Honolulu

In the advertisement of the United States Ozone Company which appeared in THE HEATING AND VENTILATING MAGAZINE for April, the statement was made that The Castle and Cook, Ltd., Building, in Honolulu, is equipped with "U. S. Controlled Ozone Water and Air Purifying Equipment." This statement, the company informs us, is quite correct as regards the water-purifying equipment, but does not apply to the air ozonizers, which were furnished by the Air Conditioning & Engineering Company, of St. Louis. The United States Ozone Company adds that the statement as it appeared was due to an error in its advertising department. The company had no intention of claiming credit for the air-ozonizing equipment installed in this building and greatly regrets the error made.

How Unit Heaters Helped in Solving a Fume Removal Problem

By William W. Gaylord

AN interesting ventilation problem, which recently came to the writer's attention, arose from the fact that four Duco spray booths had been installed on the top floor of a building originally built for light manufacturing.

The exhaust fans installed in each booth to remove the fumes were taking large volumes of heated air out of the room. As this had to be replaced from somewhere, the in-leakage of cold air around the windows was so great that the direct radiation installed under the windows was entirely inadequate. The most satisfactory remedy appeared to be to control the admission of air and warm it before distributing it in the room.

Fig. 1 shows the general layout of the room and the relative locations of the spray booths and the inspection tables where the work was inspected after being coated.

An investigation of the spray booths showed that two 18-in. disk exhaust fans were installed in each to blow the fumes out doors, but it was found that the handling of the work was such that only four fans would be operated at a time; about half the time was used in placing and removing the racks of work, which consisted of small parts.

The capacity of each fan was found to be about 2,000 cu. ft. of air per minute, so to replace this required supplying about 8,000 cu. ft. of air at 70° F. or its equivalent in warmer air. Two unit heaters handling 2,000 cu. ft. per minute at a leaving temperature of 105°, with an entering temperature of 30°, were found to most nearly meet this condition. These were installed in the positions shown in Fig. 1 and arranged as shown in Fig. 2 so as to take all or any part of their air supply from out doors.

The operation of the heaters in conjunction with the direct radiation already in place was found to be entirely satisfactory and the temperature of the room was easily maintained at 68° to 70° in all but the most extreme weather with all the air taken from out doors.

In extreme weather the recirculating of about one-fourth of the air was sufficient to keep the side of the room, where the inspection tables were placed, at a comfortable temperature and in no way interfered with removing the fumes from the spray booths. In mild weather the direct radiation is not used, as the unit heaters supply all the heat needed.

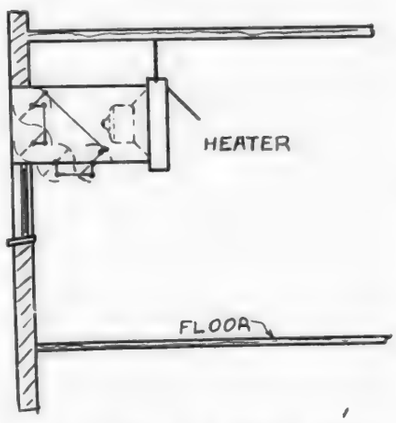


Fig. 2. Detail of Heater Showing Provision for Recirculating Air

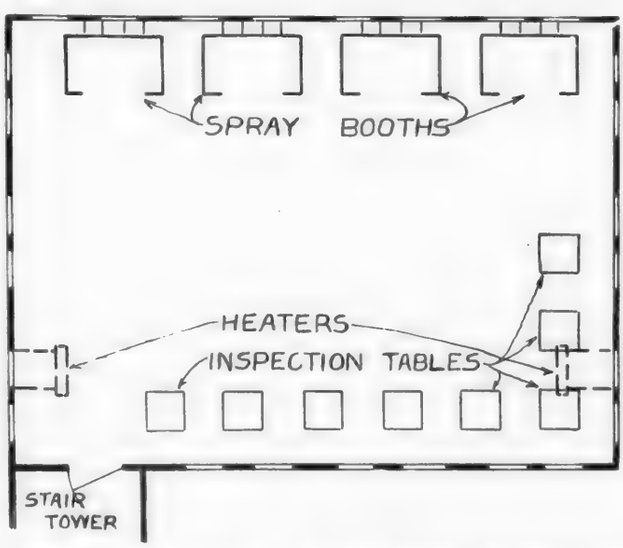


Fig. 1. General Layout of Room and Spray Booths, Showing Arrangement of Heaters

The Winter of 1925-26

The winter of 1925-26 has passed into the record as a season with little regrets, not so much because it was so severe, as because it was so changeable as to temperature in time and locality. As for precipitation, it may be said that blizzards were the exception. Two storms of marked severity, accompanied by cold waves occurred, one east of the Mississippi, from the Great Lakes to the Gulf, on December 28, and the other of similar type in like position about the same date in January.

On February 4 and 9, the most notable snowstorm of the winter placed a heavy covering of snow over the centers of the North Atlantic States and New England. In nearly all other parts of the country, the accumulation of snow rarely attained any considerable depth throughout the winter.

December temperatures generally averaged below normal; January was above normal; February was warmer than usual in the Middle West and North West and colder over the snow-covered States of Pennsylvania, New York and New England. From the viewpoint of the normal, March was the coldest month of the winter, the temperature being deficient by an average of 4°.

A Burner That Does Not Fail With the Electric Current

In connection with a statement in our December, 1925, issue to the effect that "the possibility of failure in the electric service, causing a discontinuance of heating, is one of the drawbacks of the oil burners," our attention has been called to the performance of a Kleen-Heet automatic oil burner, which operated in a building in St. Louis during and following a severe sleet storm which tore down all the wires. The burners were operated under natural draft for about three weeks. The cost to the telephone company in replacing its wires was something like $1,250,000 and to the electric company something like $450,000. The Kleen-Heet operated through this storm. This, the company states, is only one of several hundred burners that were deprived of electricity and were changed over to the Kleen-Heet on account of its natural draft operation.

The Forthcoming First American Health Congress

"Who's Business Is the Public Health?" will be the subject of one of the sessions at the forthcoming First American Health Congress, to be held in Atlantic City, May 17-22. Among the speakers will be Dr. C.-E. A. Winslow, president of the American Public Health Association, who will discuss the subject from the standpoint of the sanitarian. This session is scheduled for the second day, Tuesday, May 18, at 3 P. M. on the Steel Pier. Headquarters of the A. P. H. A. will be at the St. Charles Hotel.

Typical Radio Talks on Heating

FOR the benefit of those who are planning or who may be called upon to give radio talks on heating and ventilating subjects, as well as for the information contained in the talks themselves, we present the first of two recent addresses broadcast through Station WGES of Chicago, in connection with the Chicago "Own-Your-Home" Show. The talk on "Certified Heating" was delivered by Harry M. Hart, chairman of the board of directors of the Heating and Piping Contractors National Association. The second talk, on "Insulation" was given by Samuel R. Lewis, a well-known consulting engineer of Chicago, and former president of the A.S.H. & V.E.

Certified Heating

By Harry M. Hart

(Broadcast March 31, 1926, from Station WGES, Chicago).

THE average person when building his first home, is very much concerned about its outward appearance, the number and size of the rooms, and the number and size of the closets, but seldom does he give any thought at all to the heating system. It is only after he has gone through the experience of building and occupying one or two homes that he begins to appreciate the importance of proper insulation and proper heating.

When a friend of mine recently started to build his second or third home he asked his wife if there was anything that she particularly wished in connection with it. Her reply was "Yes, I want a good heating system and a tight roof." She was profiting by her former experience.

Years ago, when labor, heating materials and fuel were cheaper, little attention was given to the cost of heating a home. But times have changed and with the present high costs it behooves a home builder to give most careful consideration to this item. No matter how beautiful a home may be or how elegantly furnished, it will never be a home in the true sense of the word unless it is properly heated.

The average architect little appreciates his responsibility for the future happiness of his client. How can there be happiness in a home where the owner returns night after night, after a hard day at the office, to find the house cold, his wife cross from having wrestled with the heating boiler all day, the basement full of ashes and an enormous coal bill still unpaid?

I maintain that fewer marriages would end in the divorce courts if architects, builders and home owners would see that Certified Heating systems were installed in the homes.

ORIGIN OF "CERTIFIED HEATING" IDEA

The idea of certified heating originated right here in Chicago. There is in this city an association of heating contractors known as the Chicago Master Steam Fitters' Association. All members of this association are also members of the Heating and Piping Contractors National Association, an association composed of all the leading heating contractors in the United States.

Some years ago this Chicago association was confronted with a situation somewhat as follows:

The so-called speculative home-builder, in his eagerness to increase his profits, was creating a competition among heating contractors to see who could make the cheapest installation, consisting of a boiler, some radiators, and pipes leading from the boiler to the radiators, that might be passed off on the purchaser of the house as a heating system. No guarantee was required from the heating contractor, and when he protested against making the kind of installation that was being advocated by the builder he was emphatically informed that if he did not care to do it, the builder would employ some one who would.

The result was that when the builder had unloaded this monstrosity on the unsuspecting buyer and the buyer found that the heating system was entirely inadequate, he invariably went back at the heating contractor with a demand that he make it right. This placed the heating contractor, who had lived up to his contract in every particular, in a very embarrassing position, and the heating industry was rapidly losing the confidence of the public.

HOW "CERTIFIED HEATING" WAS WORKED OUT IN CHICAGO

The Chicago Master Steam Fitters' Association, realizing that something had to be done, met the situation in the following manner:

They first appointed, from among their members, a Standardization Committee and instructed this committee to draw up a set of standards, based on the best known practice, for the proper amount of radiation, size of boiler and layout of piping for steam and water heating systems. Each member of the association then pledged himself to adopt these standards as a minimum in his installations. The association then established an engineering department where each member agreed to submit the plans of his installations for approval before starting the work, and appointed an inspector whose duty it was to inspect the work after installation to see that it conformed to the approved plans, and to investigate and report on complaints that came into the association from home-owners.

Each plan, when it is approved by the Engineering Department, is given a serial number and the contractor is given an embossed plate on which appears the serial number of the job and the contractor's name. This plate is attached to the boiler. The contractor is also given a certificate made out to the owner, which bears the serial number of the job and the contractor's name. This is given to the owner when the final payment is made on the contract. This certificate is a guarantee, not only by the contractor making the installation, but by the association, that the installation conforms to the standards of the Chicago Master Steam Fitters' Association, and that the results will be satisfactory, provided the house is built according to the plans and is reasonably well constructed.

These standards, mind you, are for the protection of the heating contractor as well as the owner, for when trouble is experienced in heating a house the contractor is required to make good at his own expense, when the system has not been installed in accordance with the certified heating standards. But where the installation does conform to these standards, the trouble is invariably found to be in faulty construction of the house and the owner's attention is called to these defects and he is requested to have such defects remedied.

Since the adoption of these standards the members of this association have installed heating systems in approximately 50,000 homes, which installations have resulted in 50,000 thoroughly satisfied home-owners.

When you are riding down a street and you see a sign on a building under construction with the words "Certified Heating" in prominent letters, you can rest assured that there is a building in which there need be no trouble with the heating system.

COMMON DEFECTS IN BUILDING CONSTRUCTION

And now just a word about the defects in construction most commonly encountered. First, the chimney. Every mason contractor should be compelled to subject the chimney to a smoke test before it is accepted. A leaky chimney is like a leaky cigar—it gives no satisfaction whatever. Next to be considered is the

source of heat loss from the building. It must be remembered that the heat given off by the heating plant escapes from the building by radiation through the walls, roof and windows, also warm air in the building escapes through the cracks around the windows and doors and is replaced with cold air from outside which leaks into the building in the same manner.

These sources of heat loss reflect directly on the coal pile during the heating season, and during the summer months have a marked effect on the inside temperature. The walls and roofs should be well insulated and windows weather-stripped with high-grade weather stripping. Some may think that this excessive air leakage is necessary for proper ventilation, but even with the best of insulation and weather stripping there will be sufficient change of air for normal occupancy of any house. These are all engineering problems that the "Certified Heating" contractor is well posted on and his advice in the selection of insulation and weather stripping, the size, location and construction of the chimney should be secured when the building plans are being prepared.

PRECAUTIONS TO BE TAKEN WITH RADIATOR COVERS

Radiator covers are a source of considerable trouble to the heating contractor, because the average home-owner does not understand that when he cuts off the circulation of air through or around a radiator he is reducing the heating capacity of that radiator from 25% to 50%. This does not mean that radiator covers cannot be used, but it does mean that when they are to be used the owner should consult his heating contractor who can advise him in the proper selection and installation of the covers, so as not to interfere with the efficiency of the radiators.

The principal point is to see that there is a free circulation of air to the radiator at the floor line and out from the radiator at the top. With a properly-constructed radiator cover the room-heating efficiency of the radiator can be increased, but the common practice seems to be for the housewife to make a fancy cloth hood which she slips over the top of the radiator, thus cutting off all the circulation of air from it and then calling on the heating contractor to send an expert to see why the house does not get warm.

In closing I want to again emphasize the importance of the "Certified Heating" contractor. This idea is being carried out in other trades as well and within a very short time I am sure that people will be able to build or to buy complete houses that have been certified by each trade, thus constituting a *"Certified House."*

Heat Cabinets to Replace Direct Radiators!

UNDER the startling headline of "No More Radiators," The Trane Co., La Crosse, Wis., announces the development of the Trane heat cabinet, designed to take the place of direct radiators. It is described as an invention so revolutionary that its far-reaching effects on modern heating are beyond comprehension. It is presented as the successor to, rather than the competitor, of ordinary cast-iron radiation. Heating plants using these cabinets will be designated "Cabinet Heating Systems."

In appearance, the Trane heat cabinet is somewhat comparable to a radiator shield. One radiator, it is stated, weighs as much as ten heat cabinets for the same heating effect. In other words, enough heat cabinets to heat an ordinary house do not weigh any more than one radiator. This is due largely to the type of heating element used, which consists of a single U-shaped copper pipe with copper fins, extending all the way across the cabinet and back again. This construction, it is added, eliminates air binding because there are no places for air pockets to form.

In addition to the fact that heat cabinets occupy less space than equivalent cast-iron radiation, special emphasis is laid on the finish of these cabinets, which makes them resemble furniture. They can be furnished in a color to match any surroundings. In addition, the heat cabinet can be built into the wall, so that nothing is visible except the heat outlet. They are adaptable to all forms of radiator heating, including hot-water systems. Temperature control is applied to each heat outlet. Another feature obtained through the use of copper as a heating element is the quick response that may be obtained after steam is turned on. This effect, it is stated, is accelerated 300% to 400% by the use of the heat cabinet.

One of the most distinctive features of the new system is the construction of the heating unit in such a way that it gives off heat readily by convection, but does not radiate heat, that is, the amount of heat given off by this heating unit depends almost entirely upon the amount of air that is permitted to pass through it. Where there is no circulation, the interior remains practically at steam temperature on a steam system and, therefore, the heating effect is balanced. As soon as the air around the heating element is allowed to circulate, the admission of heat increases accordingly.

Air passing through the cabinet attains the velocity of about 200 ft. per minute. In less than ten minutes, it is stated, the cabinet will completely change the air in a room, at the same time warming it to a comfortable temperature.

A large percentage of the economy obtained with the heat cabinet is due to the fact that the air, in leaving the cabinet, is thrown out towards the front. In this way, the floor and ceiling temperatures are kept more nearly the same. As is now well-known, important economies are effected by having the floor and ceiling temperatures as nearly equal as possible.

Control of the amount of air going through the cabinet, by which is regulated the amount of heat supplied, is obtained through the use of a hand damper which extends the full length of the cabinet. By adjusting this damper, it is stated, the heat may be regulated with great accuracy. Another feature with this control is that the change in the heat supply may be made instantly.

In comparing the Trane heat cabinet with the ordinary water heating system, the point is made that the hot water system contains nearly 60% of all the water in the system, whereas a 100-sq. ft. Trane heat cabinet contains less than one quart of water. For that reason, the heating up of the system may be accelerated nearly 2½ times.

The Trane heat cabinet has been found to be especially adaptable to vapor heating installations due to the absence of air-binding trouble. The steam supply coming in from the upper connection of the U-tube acts to force the air out of the tube before it can be filled with steam vapor. In this way, it is stated, the U-tube gives a much more perfect relief of air on the vapor heating system.

Complete test data on these cabinets have been compiled by the Trane Co. and are available to those interested by addressing the company.

Richmond Radiator Company Adopts New Method of Rating Boilers

Announcement is made by the Richmond Radiator Co., New York, that the ratings of all Richmond and Model boilers are now expressed in terms of boiler output, that is, the actual cast-iron column radiation that each boiler will carry in addition to uncovered piping. These data are now available on all Richmond and Model boilers which are built according to A.S.M.E. code, tested according to A.S.H. & V.E. code, and rated according to Heating and Piping Contractors National Association code.

The boiler tests upon which all ratings are based were made in the laboratories of the Carnegie Institute of Technology, Pittsburgh, Pa., and of Robinson V. Frost, Norristown, Pa., C. E., and Samuel E. Dibble, C.E., professor of heating and ventilating at Carnegie Institute.

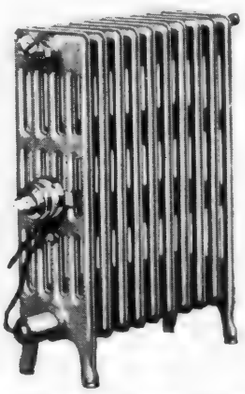
The Richmond Radiator Company has just published a new booklet, "Boiler Ratings and Efficiencies" which gives the reports of these tests, as well as reprinting the complete formulas under which the tests were made.

New Apparatus and Appliances

American Radiator Company Announces New Electric Steam Radiator

Announcement has been made by the American Radiator Company of a new addition to its line of heating products in the form of the Corto electric steam radiator. This is a complete heating unit in itself, including an electric heating element for steam generation. It eliminates the use of flues or piping. This radiator is especially adapted for heating in mild weather and for supplying additional warmth for exposed rooms in severe weather, as well as serving as a complete heating plant in the milder climates where occasional heat is all that is demanded.

The radiator is of the Corto type with slender columns and small water content, which provides for quick heating after the current has been turned on. Sections of the radiator are joined by threaded nipples of malleable iron, instead of the usual tapered slip nipples and iron rods. The whole design is of graceful and pleasing appearance. It may be painted or enameled any color to harmonize with interior decorations,



New Corto Electric Steam Radiator

and is also obtainable in white porcelain enamel to match bathroom fixtures.

Owing to the absence of flues or piping and to its light weight is may be moved to any room and, in the summer months, taken out and stored. This portable feature also makes it adaptable for use in outdoor construction and on yachts and ships.

Standard equipment consists of filler and cap, electric switch, heating element, and a 5-ft. connection cord. The switch is of the three-way type which permits of using only as much current as is necessary to supply the needed warmth. This control feature makes it easy to minimize the cost of operation. Evaporation rates are low and a single filling of water, it is stated, will suffice for the entire heating season.

A table of factors is supplied by the company for calculating the number of watts required for heating the room where this equipment is installed, based on the number of square feet of exposed wall and window surface and the volume. Another table is furnished for determining operating costs at hourly current rates ranging from ¾c to 3c per 1000 watts. The radiators are offered in three sizes as follows: 1,000-watt capacity, 7 section; 2,000-watt capacity, 10 section; and 3,000-watt capacity, 10 section. The Corto electric steam radiator is listed at $50.00, $60.00, and $66.00, respectively.

A New Oil-Fired Steam Boiler Control

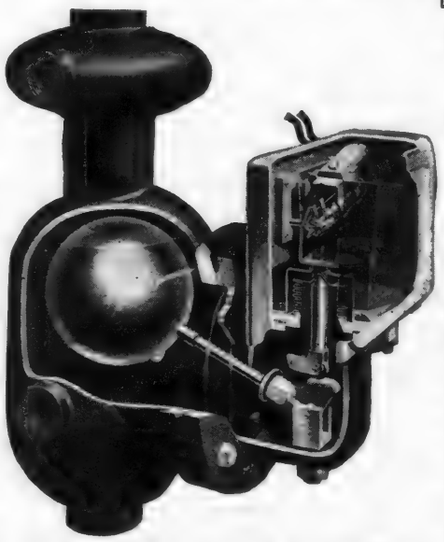
A new boiler protection unit, known as the McDonnell & Miller duplex switch, has been brought out by McDonnell & Miller, Wrigley Building, Chicago, manufacturers of the McDonnell & Miller duplex water heaters. The M. & M. duplex switch is designed to cut out the oil burner motor as the boiler waterline comes to the danger point or as the boiler pressure reaches any predetermined point for which the switch is set. It also cuts in again as the water level rises or as the boiler pressure drops.

The unit consists of a receiver containing a special float operated by a cam and roller through a sylphon bellows to throw a mercury tube switch. The same sylphon bellows which turns the motion of the float to the switch, also elongates under pressure and operates the switch in a similar manner.

The switch movement is designed to operate without springs, the point of pressure cut-out and the differential between cut-out and cut-in pressures being easily adjusted by two movable weights. The switch will cut out at any pressure between 3 oz. and 10 lbs., and the differential pressure may be varied anywhere from 1 lb. to 6 lbs.

An outstanding feature in the design of the duplex switch is that it is connected into the water column of the boiler, eliminating the necessity of tapping the boiler and allowing the placing of the switch at a point where its water level is not influenced by rapid circulation in the boiler.

To install the switch, the gauge glass is removed and the switch installed in the water column. Then the gauge glass is reinstalled in tappings provided in the receiver of the switch.



M. & M. Duplex Switch for Oil-Fired Steam Boiler Control

A New Ozone Machine

Michael DeKeyser, a chemist, of Portland, Ore., has invented a machine for producing ozone in quantities at a nominal cost. In describing his machine, Mr. DeKeyser stated that he had been working on the idea for many years.

Mr. DeKeyser Explaining Working Parts of his Ozone Machine

"The machine which I have built," he said, "can produce ozone in quantities and the price low enough to be used for commercial purposes."

While his machine is intended primarily for use in connection with the sterilization and bleaching of fats intended for use in high-grade toilet soaps and for the removal of obnoxious odors in manufacturing plants and factories, it is also adaptable for use in purifying the air in schoolrooms, theatres, office buildings and hospitals.

The DeKeyser machine produces ozone by passing dry, clean, cold air between dielectrics and electrodes of the ozonizer. The brush discharge through the dielec-

trics is established by a high-tension alternating current acting upon oxygen contained in the atmosphere surrounding the field of discharge.

For obtaining the potential necessary for effecting this brush discharge, air and air-cooled transformers are used with a frequency of 60 cycles per kilowatt. hr. with step-ups from 110 to 440 alternating current volts, and from 5000 up to 25,000 volts.

The dielectrics are made of special glass, mica or bakelite. The electrodes are of aluminum, which are non-oxydizable by ozone. Pyrex, mica or bakelite resists from 4000 to 10,000 volts. The DeKeyser invention is equipped with a special DeKeyser glass dielectric, which it is stated, is able to resist 20,000 volts during continuous operation. This high voltage is necessary to obtain the high concentration of ozone frequently necessary.

Mr. DeKeyser is a native of Belgium and has done much research work in Paris, Ostend and New York. It was while he was connected with the Pasteur Institute in Paris that he perfected many of the details of his machine. His process is covered by seven basic patents.

The Faber Electrically-Controlled Automatic Humidifying System

An automatic humidifying system designed by G. S. Faber, recently appointed chief engineer of the Art Metal Radiator Cover Co., Chicago, represents over ten years of intensive research and test work.

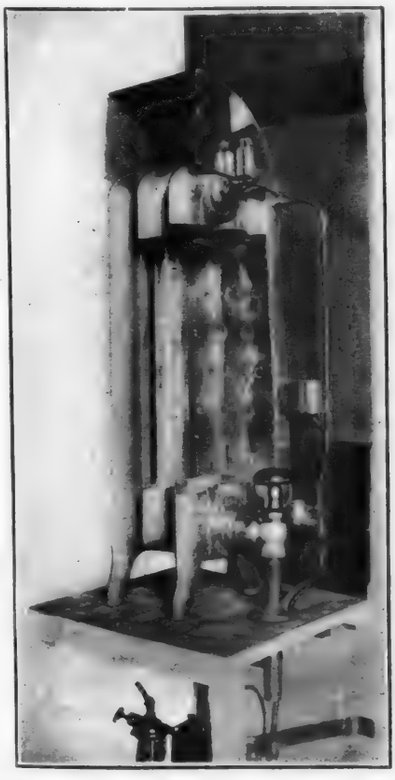


Fig. 1. Vaporizing Unit on Radiator, Cover Removed

In the accompanying illustrations, Fig. 1 shows a 3-col. 26-in. Peerless radiator cut away. Suspended on the back of the radiator is a water vaporizing pan extending the entire width and height of the radiator. Water is supplied to this pan at the top and fills up the suspended copper screen and mesh. On the front face of the pan (the face in contact with back of radiator) is a number of screen-protected openings allowing a free circulation of air to pass through and quickly to vaporize the water-film suspended on the screen. A forwardly-bent hood, allowing 6 in. between top of radiator and cover top is provided.

At the right-hand of the radiator pan and half-way down to the floor is a small housing. Within this projection is an electrical float-switch mechanism.

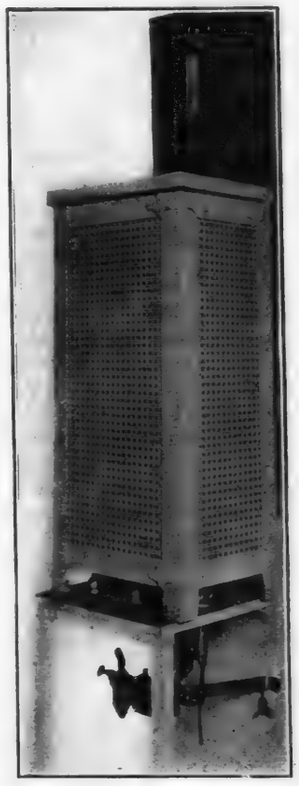


Fig. 2. Complete Installation Comprising Radiator Cover, Hygrostat on Wall and Electrically-Operated Valve in Basement

At the bottom of the pan and to the right, directly below the float switch housing is a Crane check valve, used to drain the entire unit to a sewer connection in the basement.

Fig. 2 indicates a complete unit on a display board. As the room in which the unit is installed becomes dry, an electrical contact through mercury is made by the Hygrostat. The Hygrostat opens an impulse valve under the floor board in the basement, allowing water, which has first passed through a strainer, to continue up the small copper tube (run alongside supply riser and under pipe covering) to the vaporizing unit on the radiator. (See Fig. 1).

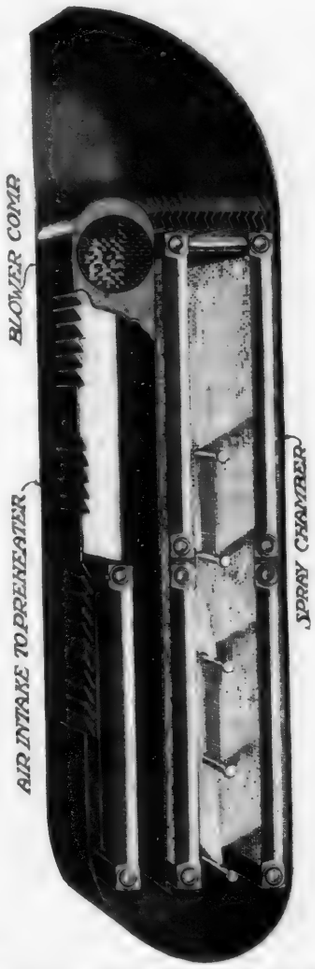


Fig. 3. School and Industrial Type of Faber Humidifier

As the room receives the required amount of moisture for which the Hygrostat is set, another contact through mercury shifts the impulse valve to drain position. This draws the entire copper tube water-supply line, plus all water which may not have been evaporated and accumulated in the bottom of the pan, to the sewer.

Fig. 3 shows the school and industrial type of humidifier comprising wall radiation, sprays and a Sirocco blower for forcing air circulation. Preheated water to the system prevents cold water coursing the steam or hot water line and in that way, robbing any heat units from the radiator. Small pipe lines are prevented from freezing by reason of the automatic drain features.

A simple wiring system is provided from currents supplied by an especially-designed General Electric transformer fed from the house wiring system.

Gaso-Fan Provides Ventilation in Difficult Places

A type of portable blower for ventilating manholes, tanks, tank cars, etc., where no electricity is available and fresh air is wanted, is manufactured by the B. F. Sturtevant Co., Hyde Park,

Boston, Mass. It is called the Gaso-Fan by reason of its gasoline-engine drive, and is offered in two sizes. The smaller size is designed to deliver from 320 to 430 cu. ft. of air per minute and the larger to supply volumes ranging from 775 to 1050 cu. ft. per minute. These outfits weigh 75 and 85 lbs., respectively, which allow either to be conveniently carried by one man. Operation is by means of a Briggs & Stratton 4-cycle, single-cylinder, air-cooled engine, capable of operating 10 hours on 1 gal. of gasoline.

New Two-Stage Dry Air Filter

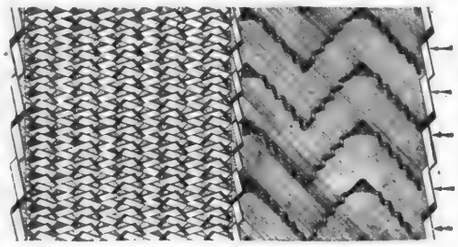
A new type of two-stage dry air filter designed to obtain the maximum amount of cleaning with a minimum amount of resistance, when the filter does not receive proper attention in the way of cleaning and re-oiling, has been placed on the market by the General Air Filters Corp., 110 West 42nd St., New York. As will be noted from the accompanying

Front View of Filter Cell

illustration, this filter uses a baffle arrangement in the first stage. These baffles are continuous and overlapping, allowing for a removal of the bulk of the dirt and dust entrained in the air in the first stage. The second stage is designed to remove the very fine particles of dust in the air.

The filter is described as extremely light in weight; due to the use of an especially-designed expanded metal used exclusively in this filter. The light weight, however, does not affect the strength of the filter as the welded construction makes for a rigid and sturdy piece of equipment.

The baffles are so arranged that a trough is formed which acts as an oil reservoir, thus assuring a continuous supply of oil over a long period. The importance of this is emphasized inasmuch as in a large number of cases, filters of this type, which may not be giving good service, will often be found coated with dust, resulting in a dry surface.



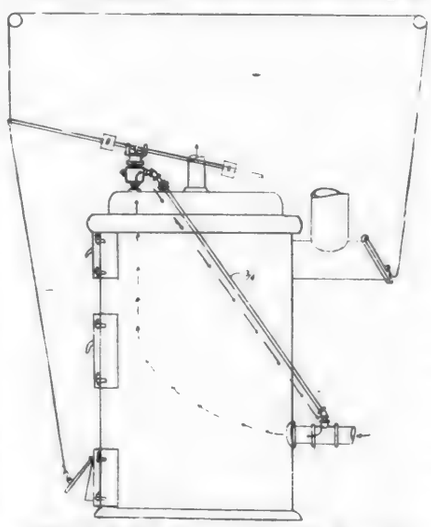
Second Stage First Stage

Section Through Filter Cell Showing Systematic Arrangement of Filter Media

As an indication of the amount of dust which can be arrested by this type of filter without increasing the air resistance materially, tests made in the laboratories of the General Air Filters Corporation by disinterested parties are quoted showing that when the filter had as much as two quarts of dust in the filtering media, the resistance to the air flow was only 0.04 in. water gauge and the average resistance was well under 0.25 in. water gauge. Of course, two quarts of dust per filter cell is comparatively a large amount and under ordinary conditions, it would be necessary for the filter to go without cleaning for a considerable period to accumulate this much dirt.

New Fitting for Type F Metaphram Damper Regulator

TYPE F METAPHRAM DAMPER REGULATOR, for water boilers and domestic water heaters, as equipped with its new fitting, is described in a folder issued by the National Regulator Co., 2301 Knox Ave., Chicago. The accompanying sketch shows a water boiler fully equipped with a Type F fitting on the top of the boiler and with a ¾-in. pipe leading back to the return. The arrows indicate the circulation of water to the regulator which controls the damper on the boiler. On many boilers, there is not sufficient depth to insert the well of this regulator and the new fitting is

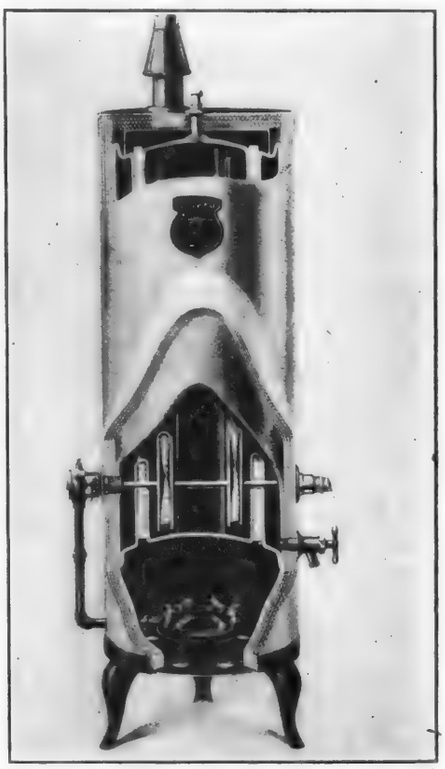


Water Boiler Equipped with Type F Fitting on Top and with a ¾-in. Pipe Leading Back to Return

designed to take care of that condition. In some cases, the tapping is not large enough, while in other cases, the boilers have been installed years before without any automatic regulation and no provision made to insert a regulator. It would be expensive in some cases to try to insert this regulator in the flow line. In all boilers there are generally two ¾-in. tapped openings, one for the thermometer and one for the altitude gauge. One of these openings can be used for the special fitting, as shown, and connected up, also as shown. This will allow hot water to circulate through the special fitting at practically the same temperature as that of the water in the boiler. It can be installed, the company states, with a minimum of expense.

Lovekin Brings Out New Water Heater

LoveKo is the name of the newest addition to the line of water heaters manufactured by the Lovekin Water Heater Co., Philadelphia, Pa. This is a moderately-priced water heater having six extra-heavy 1¼-in. heating tubes



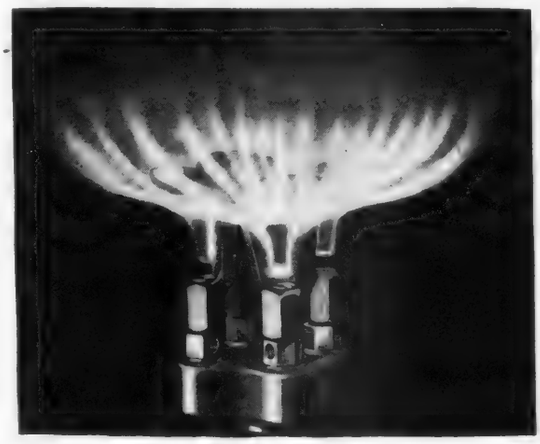
Design of New LoveKo Water Heater

running up through a 22-gal. storage tank. Each of these tubes contains a spiral corrugated baffle plate which adds to the heating surface. This principle of conducting heat through vertical tubes running the full length of the boiler is that used in steam boiler construction. Copper coils, heating sections, and spreaders are dispensed with. The tank is insulated throughout with asbestos and is especially designed for heat retention. Finished in two shades

of gray and nickel, the heater presents an attractive appearance. It is equipped with a Cleveland gas burner and is automatically controlled by a Robertshaw positive-acting thermostat. It is listed at $105.00.

New Types of Gas Burners

Two new designs of gas burners, adaptable to various heating appliances, in which a short body of flame is required which may be so spread as to apply heat to large areas and still permit the burner to be placed close to the area or surface to be heated, have been brought out by the Cleveland Gas Burner and Appliance Company, Cleveland, Ohio. They are known as the J-41 and J-80 Barber jet burners.

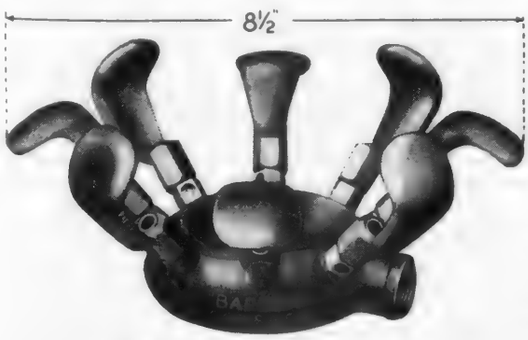


J-41 Barber Jet Gas Burner

These jets embody the same features of design that are characteristic of the regular line of Barber jet burners, although in order to obtain the wide range of flame applications, to suit various conditions, the jets may be placed in the manifold in vertical or horizontal positions or at an angle, without reducing their efficiency. In operation they produce a high-flame temperature without back-firing or depositing carbon, while the flame upon all gases is orange-green in color.

The control of the flame-spreading ability is created by means of a unique device which slips over the tube portion of the jet which may be revolved or regulated to provide such range of flame direction as may be desired. The flame spreader or director also guarantees against back-firing.

The important features embodied in these burners are covered in a patent issued to Harry E. Kerr, president of the Cleveland Gas Burner and Appliance Company, under date of November 3, 1925.



J-80 Barber Jet Gas Burner

New Books

THE DESIGN OF GRAVITY CIRCULATION WATER HEATING SYSTEMS, is the title of an important new book by F. E. Giesecke, Ph.D., of the University of Texas, comprising, in extended form, the articles on this subject which appeared last year in THE HEATING AND VENTILATING MAGAZINE. The book is privately printed by Professor Giesecke, the Heating and Ventilating Magazine Company being named as the selling agent. It is sold at $3.00 net.

In this book, Professor Giesecke has rendered a much-needed service to the heating profession in the presentation of a concise, yet inclusive treatise on the design of gravity water heating systems.

The distinct advantages of water heating have long been recognized by heating engineers and without doubt a much larger proportion of modern installations would have been designed as "hot water jobs" if engineers had had at their command practical, workable data, upon which they could depend in the design of such systems.

For the most part, data which have been presented to the engineering profession for this purpose have been almost entirely theoretical, lacking in a systematic method of application.

It is just here that Professor Giesecke is making the greater contribution to the art of heating. Those of us who have been designing water heating systems for some time appreciate this most fully. While there is still room for further experiments, particularly with reference to the friction in commercial pipe at those higher velocities encountered in forced circulation, yet the experimental work of Professor Giesecke in this field is a distinct addition to that heretofore presented. The reduction of these experiments not only to a comparatively simple formula, but to charts as well, places before the heating engineer authentic information for easy, practical application.

While the charts presented in the book may be read with a fair degree of accuracy, it is suggested (and very possibly Prof. Giesecke has this in mind) that enlarged charts be prepared for more easy application by those who are more or less constantly designing water heating systems. These charts could advantageously be constructed for both gravity and forced circulation and for the latter should include sizes up to 24 in. O.D.

One of the features introduced by Professor Giesecke in designing water heating systems which we believe has generally not been practiced by heating engineers is that of varying the size of radiators, as well as the pipe sizes, in order to secure the theoretical heat delivery desired.

It has been the usual practice, we believe, to arbitrarily fix the radiator sizes from computed heat losses and then manipulate pipe sizes as far as possible to secure the desired heat flow. This idea of also varying the radiator sizes makes it possible to get better equalization without "splitting sizes" on radiator connections.

The subject matter of the book is presented as a series of practical applications starting with the elemental gravity water heating system and presenting in turn the design of a total of nine different types of systems, as may be adapted to different types of building construction.

The work has been presented under the following classifications:—

Chapter 1: "Fundamental Explanations," is a concise statement of the underlying principles of hot water gravity circulation, and the fundamental problem of designing the system, so that the pressure-head available shall equal as nearly as possible the friction-head of the circuit.

Chapter 2: "The Elementary Heating System," deals with the design of the simplest possible system, and establishes the method of sizing.

Chapter 3: "The One-Pipe Heating System," applies the principle and methods shown in the earlier chapters to the one-pipe system.

Chapter 4: "The Two-Pipe Heating System," further elaborates on the design of a two-pipe heating system, such as is commonly used in a majority of gravity water heating layouts.

Chapter 5: "Direct and Reversed Return," is a discussion of the different possible and advisable schemes for the layout of the mains.

Chapter 6: "Systems with Overhead Distribution," shows the method of applying the principle of sizing a system when the supply main is located at the top floor of the building.

In addition to the discussion of the various types of systems and a demonstration of the method of sizing, the book contains tables and charts which are necessary to the engineer in applying this method in actual practice. These charts are the result of research work on the part of Professor Giesecke extending over a number of years, and without doubt constitute the most reliable data which we now have for use in the design of water heating systems.

The similar application of the fundamental principles of water heating to forced circulation might well be the subject of another series of articles which would be welcomed in book form.

—A. W. MOULDER.

Performance Characteristics and Methods of Testing Centrifugal Fans

Tests showing the performance of centrifugal fans, with notes on the selection of fans for induced draft installation and long duct installation, are contained in a bulletin (No. 34) by Professor George Samuel Wilson, professor of mechanical engineering; William Lyle Dudley, vice-president and chief engineer of the Western Blower Company, and Harry John McIntyre, assistant professor of mechanical engineering at the University of Washington. The tests include those for a centrifugal blowing fan and a centrifugal exhausting fan. Of the 25 test charts included in the bulletin six show performance characteristics of centrifugal blowers having straight blades. Two charts show similar data for a radial blade fan with the tip curved backward with reference to the direction of rotation. "A fan of this type," states the report, "has all the advantages of operation inherent in the radial blade fan with the added advantage of higher speed for the same pressure. This advantage of higher speed is of practical use where conditions require direct connections to high-speed drivers." Two other plates show characteristic curves of two experimental fans lately developed. The fan wheels carry full backward curved blades. The blade requires a high tip speed to develop its pressure and so lends itself quite readily to directly-connected motor drive. The pressure characteristics, it is stated, are desirable and indicate stable operation. The rapidly falling pressure from zero to full discharge results in a limited capacity range. To operate within the pressure range, the capacities required by the ordinary ventilating systems will require a large fan of this type as compared with the compact multi-blade fan.

In selecting a fan for a particular installation, it is pointed out, the general type may be chosen from the characteristic curves. An example is given of the factors involved which determine the size and speed of a fan for a long duct installation and for an induced draft installation. Published by the University of Washington, Seattle, Wash. Size 6 x 9 in. Pp. 38. Price 30 cents.

C. A. Dunham Co., Chicago, Ill., announces its removal to the Dunham Building at 450 East Ohio St. In addition to the Dunham Company, the affiliated companies, the Young Pump Company, Dunhameter Corporation, the Walter H. Prier Company and the Dunham Building Corporation will have offices in the same building.

Death of Andrew B. Barr

ANDREW B. BARR, founder and owner of the A. B. Barr & Company, heating engineers of New York and Yonkers, and known as the first heating engineer to introduce the hot water system of heating in the United States, died suddenly at his home in Yonkers, March 6. His death was caused by an attack of angina pectoris. He was 72 years old.

Mr. Barr, who was widely known in heating engineering circles, early saw the possibilities of the hot water system, at a time when that type of heating was used only in plant nurseries. He decided that the system could be used in homes and large institutions and after experimentation and study, he proved the truth of his theory.

Mr. Barr was born in Rochester, N. Y. His first position of importance was as superintendent of the E. H. Cook Company, Rochester heating engineers. It was while with this concern that he began his pioneer work in the hot water system. He supervised the installation of water heating systems in Chicago, Denver, Rochester and other large cities. When the E. H. Cook Company retired from business, Mr. Barr established his own company in Rochester.

While in business for himself he came to Yonkers to install a hot water system in the St. Joseph Seminary in Dunwoodie. At the time it was the second largest water heating system in the United States. This was 31 years ago. Shortly thereafter Mr. Barr moved his business to Yonkers, and established a branch office in New York.

Mr. Barr was the inventor of the Geyser water boiler which was adopted by the Yonkers public school system and used in the schools there for many years. Some of his important installations are those in St. Anthony's Hospital, Brooklyn; the Mount St. Vincent College, Riverdale; the Convent station, Convent, N. J.; and the Hollywood Inn, Yonkers. Recently his firm installed a hot water system in the new building of the Otis Elevator Company, in Yonkers.

About two years ago Mr. Barr was forced to undergo the amputation of his leg.

Mr. Barr was at one time vice-president of the People's Saving Bank of Yonkers. He was also a member of the old city water board before the change in the city's charter, serving from 1904 to 1907 by appointment of Mayor Andrus.

Death of W. R. Jones

W. R. Jones, formerly Superintendent of Buildings and Grounds and later Engineer of the Plant, University of Pennsylvania, Philadelphia, Pa., and well-known as a consulting engineer, died February 3. Mr. Jones was 51 years old. He was the author of the Jones tables of heat loss co-efficients which appeared in THE HEATING AND VENTILATING MAGAZINE during 1921, and were later incorporated in THE HEATING AND VENTILATING MAGAZINE Standard Data Sheets. Mr. Jones was a member of the A. S. H. & V. E., A. S. M. E. and the American Society of Illuminating Engineers, also the Engineers' Club of Philadelphia. He was graduated from the University of Pennsylvania, Class of 1899, and took his master's degree in mechanical engineering from the same university in 1911.

FRANKLIN VAN WINKLE, for many years in charge of the "Questions and Answers Department" for *Power*, New York, died at his home in Paterson, N. J., February 18. Mr. Van Winkle was seventy years old. He frequently attended conventions of the National District Heating Association, The American Society of Heating and Ventilating Engineers and the Heating and Piping Contractors National Association as a representative of *Power* and had a wide circle of acquaintances in the heating and ventilating field. Personally, Mr. Van Winkle was a man of charming personality and was affectionately known as "Van" in the industrial publishing world. Mr. Van Winkle was graduated from Stevens Institute of Technology in the class of 1877 and was for some time professor of engineering in the Texas Agricultural and Mechanical College. Later, he acted as a consulting engineer in the planning, construction and testing of power plants. He was the inventor of the Van Winkle Dynamometer, extensively used for measuring power before it came to be sold by the kilowatt.

OTTO BIEFELD, a well-known heating and plumbing contractor of Watertown, Wis., died at his home in that city at the age of 65 years. Mr. Biefeld was a member of the Heating and Piping Contractors Wisconsin Association as well as of the national association. Two sons and two daughters, who have been associated with him, will continue to operate the business.

FRANK V. VATER, president of the Power Plant Specialties Co., Chicago, Ill., and a well-known figure in the power field, as well as in the district heating field, was killed in an automobile accident near Milwaukee some weeks ago, it has just been learned. He was 66 years old. Mr. Vater was recognized as an authority on water treating apparatus and his appearance before engineering meetings was always an assurance that something of interest and value would be added to the discussion.

WILLIAM G. CARLTON, superintendent of power for the New York Central Lines, and active in the National District Heating Association, died April 15 of pneumonia, at St. John's Hospital in Yonkers, N. Y. He was 57 years old. Mr. Carlton had been identified with the New York Central Lines since 1905 in an engineering capacity and advanced rapidly to the position of superintendent of power for all of the company's roads. In 1922, it has been learned, he declined the nomination of president of the National District Heating Association.

New Trade Publications

MARSH IMPROVED LOW-PRESSURE HOUSE HEATER STEAM GAUGE on which the first five pounds are marked by a 2-oz. division and which is graduated on up to 30-lbs. pressure, has been brought out by the James P. Marsh & Co., 114-124 So. Clinton St., Chicago, Ill., and is described in a newly-issued circular. With this gauge, the lowest steam pressure may easily be read in ounces. The gauge is furnished in four sizes, 3½ in., 4½ in., 5 in. and 6 in. at a price, it is stated, no higher than the old style low-pressure steam gauge.

New Marsh Low-Pressure Steam Gauge

PEERLESS INDUSTRIAL HEATING UNITS, for use in industrial buildings, such as factories, mills and garages, is a new product of the Peerless Unit Ventilation Co., Inc., Long Island City, N. Y., described in a newly-issued circular. An especially-designed radiator, which, it is stated, is obtainable only in these units, is a part of the equipment. Where desired, automatic control of room temperature can be provided by means of a thermostat for shutting off the heat by stopping the motor and for turning it on by starting the motor. Where special provision for ventilation is desirable, the necessary extra equipment can be furnished, such as wall boxes or ducts for bringing in fresh air from out-of-doors, and mixing dampers for regulating the volume of ventilation. Also, a deflector can be added as extra equipment, when wanted, to change the direction of air flow from the unit. Peerless industrial heat units are made in two types, 18 in. and 24 in., the 18-in. type being furnished in three sizes and the 24-in. in four sizes. The necessary data for each size are included in the circular. Size 6 x 9. Pp. 4.

HEAT INSULATION WITH CABOT'S INSULATING QUILT is the title of a catalog issued by Samuel Cabot, Inc., Boston, Mass. This catalog covers thoroughly the method of manufacture, the materials used and the application of Cabot's "Quilt." It is replete with data, both in text and illustrations, telling the story of the insulation as applied to homes. Methods of applying "Quilt" in residence construction are shown in detailed drawings. A section is devoted to the subject of scientific tests for insulation; one to simple and economical methods of cold-storage construction; one to the quilt as a fire protection, and a large amount of space to the insulation of residence roofs. Supplementary to the catalog is an insert entitled "Deadening the Noise of Oil Heaters." A drawing is shown illustrating the application of Cabot's Quilt to the ceiling of a furnace room, with the result that the noise from an oil burner was almost entirely eliminated. Size 7½ x 10½ in. Pp. 24.

REGISTERS AND GRILLES, containing pages from catalog No. 78 devoted to engineers' data, has been separately published by Tuttle & Bailey Mfg. Co., 441 Lexington Ave., New York. The catalog shows a wide variety of styles and prices included in the company's line. Size 7½ x 10½. Pp. 16. The company also publishes an announcement containing its new grille, which is designated as steel-cane woven. It is described as a reproduction in metal of the cane work which for centuries has been used by masters in furniture design. It is designed for use in heating and ventilating registers, radiator cabinets and other interior work. The grille, it is stated, is actually woven just as in cane work. It affords an air space of 60%, and is sold in rolls approximately 50 ft. long by 36 in. wide, trimmed, but without finish.

Another new circular issued by the company is devoted to the Tuttle & Bailey line of radiator cabinets. Five styles of cabinets, all made of steel, are illustrated and described, showing the various finishes which the company is prepared to furnish with each style.

KLIPFEL AUTOMATIC VALVE SPECIALTIES for steam, water, air, gas and oil are featured in a comprehensive new catalog issued by the Klipfel Mfg. Co., 2641-59 W. Harrison St., Chicago. The company's line includes automatic valve specialties for the control of pressure, temperature and humidity. The present catalog is devoted to descriptions and illustrations of the company's complete line, with the exception of temperature regulation and humidity regulation specialties, which are the subject of another catalog. A Klipfel No. 1 pres-

Front View of Peerless Industrial Heating Unit, Showing Radiator

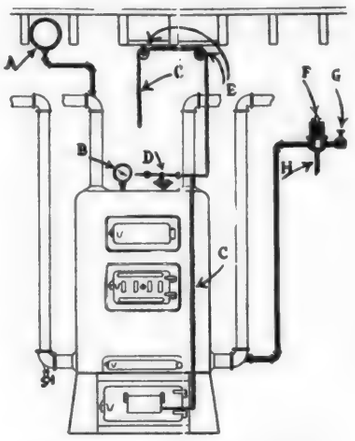
Rear View of Peerless Industrial Heating Unit, Showing Motor Fan

sure regulator, piston type, is given the place of honor. Full descriptions of the operation of each specialty as well as broken views of the units themselves, are presented. Sizes 7¾ x 10¾. Pp. 78.

WEINMAN STEAM-DRIVEN PUMPS AND RECEIVER UNITS is the title of Bulletin No. 410 issued by the Weinman Pump Mfg. Co., Cleveland, O. These units are designed for use with steam heating systems to return promptly to the boiler, condensation from the radiators, steam coils, heaters, etc. The condensate flows into the receiver by gravity and the pump, actuated by a copper-ball float connected to a quick-opening valve in the steam line leading to the pump engine cylinder, returns it to the boiler with little loss of heat. The receiving tank,—tested to 100 lbs. hydrostatic pressure,—is mounted on a hollow column to which is connected the suction line leading to the pump. This column is so constructed as to form a sediment chamber and thus to prevent any gritty substance from entering the pump cylinder. The pump is designed to prevent variations in steam pressure from affecting its action; also to prevent snapping and water hammer in the pipes. The pump is built in nine regular sizes to drain from 3,000 to 90,000 sq. ft. of direct radiating surface, and in four special sizes to drain from 5,000 to 40,000 sq. ft. of direct radiating surface.

UNIVERSAL SMOKE-PREVENTING STEAM AND HOT WATER HEATING BOILERS for bituminous or anthracite coal, wood, coke, gas or oil is an interesting product of the Universal Smokeless Boiler Co., Ravenna, O., described in newly-issued circulars. A feature of this boiler is its equipment with a hot blast oxidizing tuyere and a high-temperature cement baffle section. A battery of vertical water tubes directly in the rear of the fire box is an important factor in the boiler's efficiency. These boilers are made in two series, 24 in. and 36 in. for steam and water. The company also manufactures a smokeless, double-grade, down-draft type in corresponding sizes.

SAFOTROL SYSTEM for use with water heating systems, has been brought out by the Safety System, Richmond, Ind., and is described in recently-issued circular matter. It consists of four units, including the Safotrol valve for maintaining a circulating pressure from not more than 10 lbs. to only a few ounces of pressure, a Safotrol tank in the basement, a Safotrol automatic damper regulator and a Safotrol gauge. How the Safotrol system saves fuel is explained

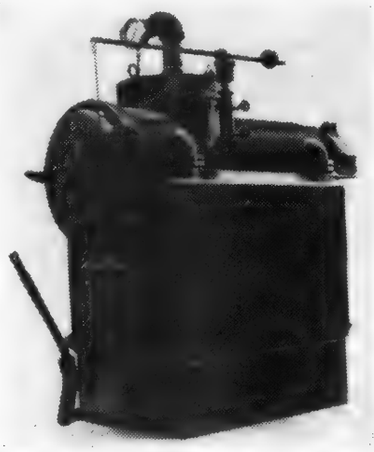


A—Safety Tank—Capacity as System may require
B—Special gauge.
C—Chains to dampers in smoke pipe and ash pit.
D—Automatic regulator.
E—Ball bearing pulleys.
F—Safety relief
G—Filling valve for occasional supply of water to Heating System.
H—Discharge operated by Automatic Safety Valve when pressure is above maximum allowed.

Typical Installation of Safotrol System

in the statement that it maintains uniform and slightly higher pressure, thus allowing the water to absorb more heat from the fire, that it decreases air pockets in radiators and piping systems, thereby speeding up circulation, and that it permits the use of smaller valves and fittings, thus reducing the cost of installation.

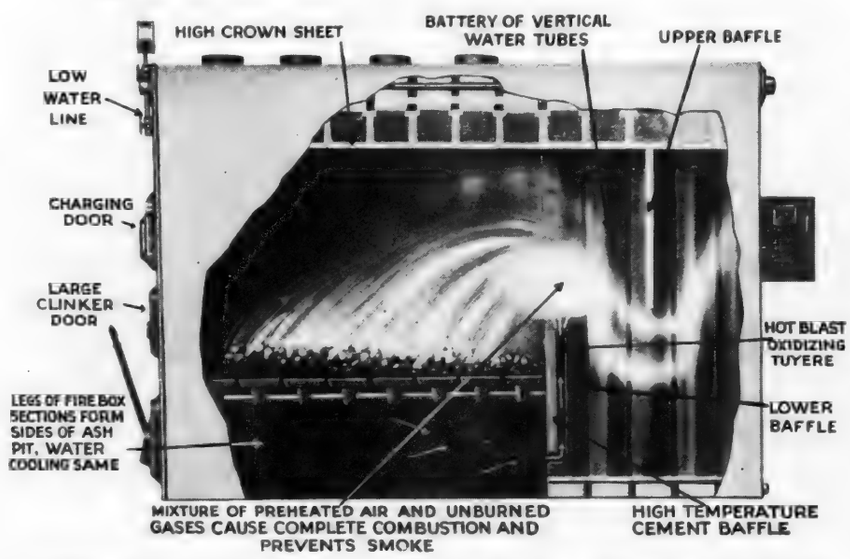
PACIFIC STEEL RESIDENCE BOILERS are described in a folder issued by the General Boilers Co., Waukegan, Ill. These boilers can be installed in any building



Pacific Steel Residence Boiler for Burning Soft Coal, Hard Coal, Gas or Oil

having a 30-in. door leading to the basement. They are built for steam, vapor, or water heating and will burn soft or hard coal or can be used with oil or gas burners. Being built of steel they are designed to cut down repair bills to a minimum. Floor space requirements, it is pointed out, are no more than for cast-iron sectional boilers. These boilers are furnished in three sizes for steam and three for water heating. The net ratings are: For water heating, with hard coal as a fuel, 800, 950, and 1,000 sq. ft. of radiation; and, for steam, 500, 600, and 700 sq. ft. of radiation. These ratings are net so that no excess boiler capacity needs to be added to the radiation load when installing these boilers.

INTERNATIONAL HEATER COMPANY'S SALES BINDER has been supplemented by additional sheets, including reports of some new tests made on gas-fired steam boilers. These tests were made in Buffalo from November 25, 1925, to February 28, 1926, in a two-family, seven-room flat building of standard clapboard construction. The burners used were two standard No. 7 unit burners, manufactured by the Hall Mfg. Co., Toledo, O., and the boilers used were two standard E-324 International Economy steam boilers, manufactured by the International Heater Co., Utica, N. Y. The heating system was single pipe. Copies of the monthly gas bills are included, showing the total cost, up to the end of February, of $157.09, or an average of about $20.00 per month. Mixed gas was used, approximately 65% natural and 35% manufactured. The B.T.U. value was approximately 850 B.T.U. per cubic feet. The pressure was from 3 to 4 in. The tests were made by H. R. Black of Buffalo without the


HIGH CROWN SHEET
BATTERY OF VERTICAL WATER TUBES
UPPER BAFFLE
LOW WATER LINE
CHARGING DOOR
LARGE CLINKER DOOR
LEGS OF FIRE BOX SECTIONS FORM SIDES OF ASH PIT, WATER COOLING SAME
HOT BLAST OXIDIZING TUYERE
LOWER BAFFLE
MIXTURE OF PREHEATED AIR AND UNBURNED GASES CAUSE COMPLETE COMBUSTION AND PREVENTS SMOKE
HIGH TEMPERATURE CEMENT BAFFLE

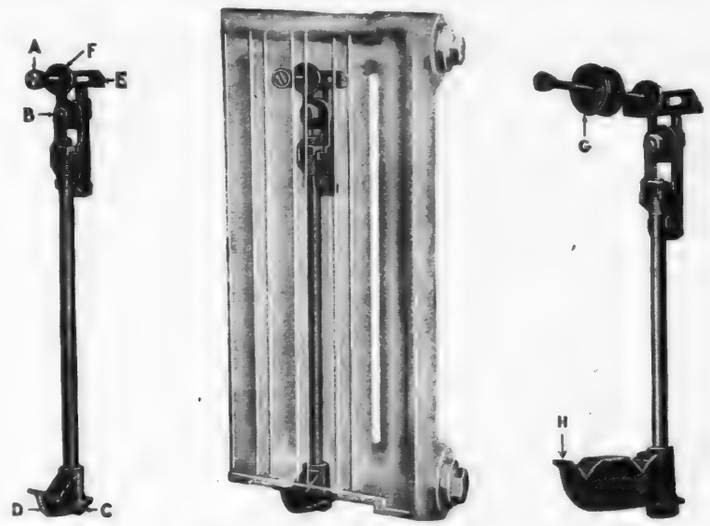
Universal Smoke-preventing Heating Boiler, Showing Tuyere and Baffle Section

knowledge of the company, but proved so interesting and indicated such a remarkable efficiency that permission was procured to reproduce the report in the company's sales binder.

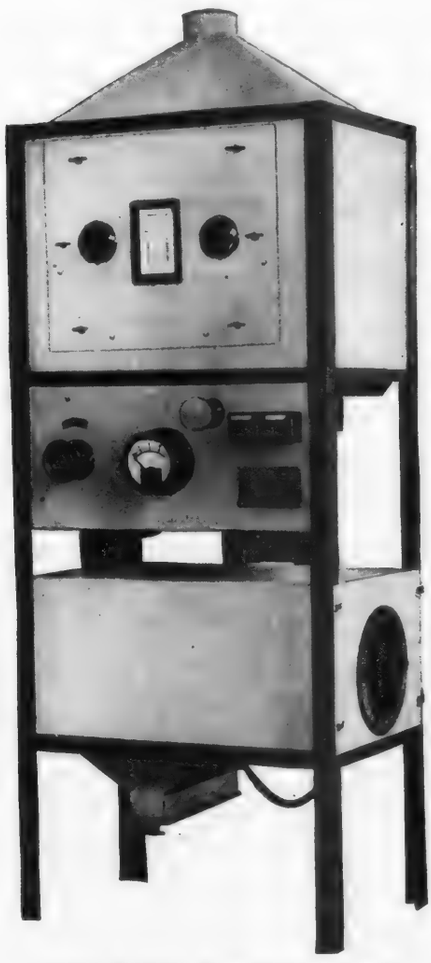
GORTON HEATING EQUIPMENT, including the Gorton single-pipe vapor heating system, the Gorton quarter-turn packing-lock radiator supply valve for all systems of heating, and a section on miscellaneous data, made up in part of extracts from THE HEATING AND VENTILATING MAGAZINE, is described in a handy catalog issued by the Gorton & Lidgerwood Co., 96 Liberty St., New York. In the first section, very complete information is given on the installation, regulation and operation of the Gorton single-pipe vapor heating system, illustrated with piping layouts and auxiliary parts for this equipment. Section 2 includes a number of representative installations, in addition to a description, fully illustrated, of the construction details of this supply valve. Under miscellaneous data are given notes on the effect of enclosing radiators, on climatic conditions, a low-pressure heating fuel chart, and pipe sizes for the Gorton system. Size 3¾ x 6¾. Pp. 84.

ELECTROZONE SYSTEM OF VENTILATION is described in a publication issued by the Air Conditioning and Engineering Co., St. Louis, Mo. It is stated that there are now almost three hundred Electrozone installations throughout the United States, chiefly in school and other public buildings. Considerable data are presented to substantiate the claims made for this equipment, and a number of photographs show buildings in which the Electrozone is installed. Size 8½ x 11. Pp. 8.

GRINNELL ADJUSTABLE COLUMN RADIATOR BRACKET AND WALL RADIATOR BRACKET, with only three points of contact, have been brought out by the Grinnell Co., Inc., Providence, R. I., and are described in recent circular matter issued by the company. The column radiator brackets are designed to support the legless type of column radiators. When installed, the bracket is practically out of sight. But one bolt is necessary to securely fasten the bracket to the wall. Also, when the hook bolt is used, it can be set without extremely accurate measurements because there is a liberal adjustment of the bracket vertically. As only three points of the bracket touch the wall, the difficulty often experience with uneven walls is practically eliminated. The brackets are made of malleable iron.

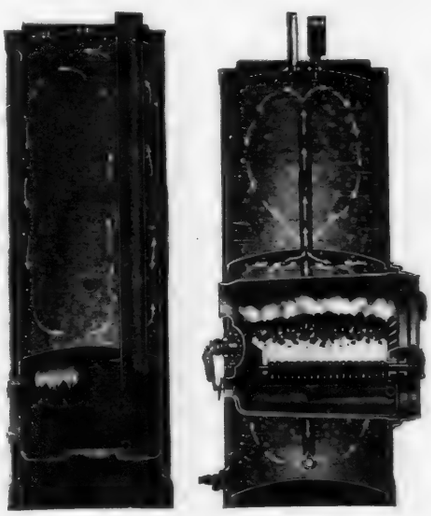


Grinnell Adjustable Wall Radiator Brackets



Latest Design of Electrozone Unit

INSTANT HOT WATER FOR EVERY NEED at lowest cost is the way the American Radiator Company describes the functioning of its Arco tank for hot water supply, which forms the subject of one of its latest catalogs. Arco tanks for hot water supply are a new product of the company and are made in a complete range of sizes, for both coal-burning and gas-burning. Each is a self-contained unit. The coal-burning tank contains within itself the fire that generates the heat. It is described as the first combination coal-burning water heater and storage tank ever produced. The fire pot is specially designed, being made from one single, flat piece of extra-heavy, seamless, sheet-steel. This sheet is first drawn through a press and roughly formed into a large pot. After going through an annealing process, it is again drawn through the press and again subjected to the annealing process. This is repeated six times. The fire pot, therefore, is all in one seamless piece and equally strong at every point. When covered by water on top, sides and bottom, it is calculated to insure the absorption and utilization of the heat of the fire in the highest degree. All welded joints, it is pointed out, are external to the fire. Each tank is made of 1/8-in. cold-rolled steel and is galvanized inside and out to prevent rust and corrosion. A special section of the catalog is devoted to the thermostatic control which is furnished for either type of tank. Data are included covering measurements and capacities, which range from 30 to 100 gal. in the coal-burning types, and from 20 to 43 gal. in the gas-burning types. Size—7½ x 10¾ in. Pp. 24.



GAS TANK COAL TANK

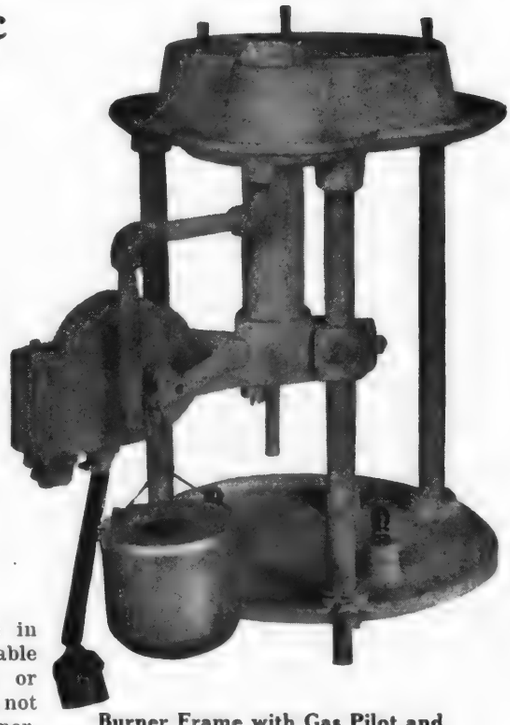
New Types of Arco Tanks for Hot Water Supply

Present Accepted Practice in Domestic Oil Burners

19. Super Oil Heator. *Atomizing. Gravity Oil Feed to Carburetor and Pump Feed to Rotary Atomizing Nozzle. Continuous Gas Pilot.*

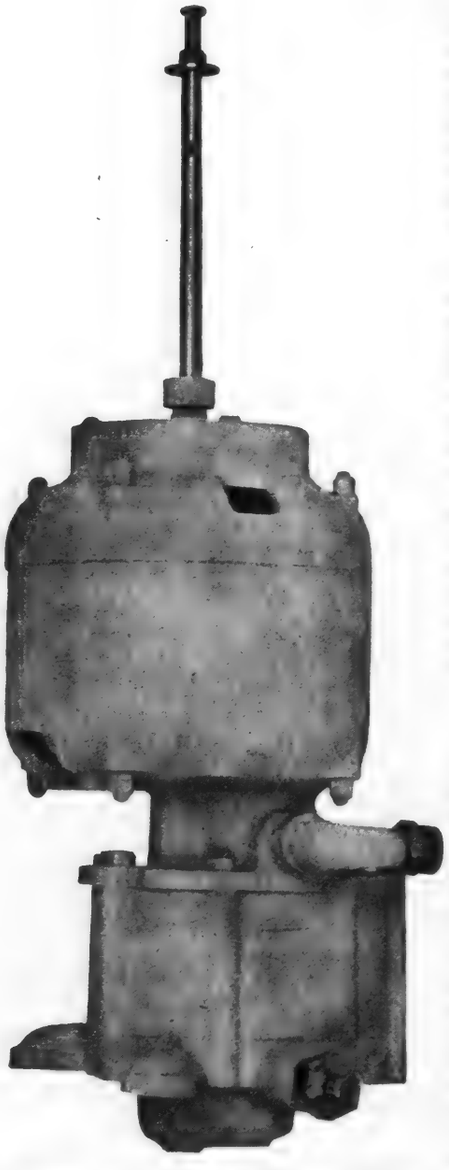
Previous articles in this series are:

1. *Kleen Heat, July,* 1925.
2. *Baker, July,* 1925.
3. *Kerrihard, July,* 1925.
4. *Silent Glow, August,* 1925.
5. *Aetna, August,* 1925.
6. *Caloroil, September,* 1925.
7. *Oil-O-Matic, September,* 1925.
8. *Chalmers, October,* 1925.
9. *Hart, October,* 1925.
10. *Sun, October,* 1925.
11. *Rayfield, November,* 1925.
12. *A. B. C., November,* 1925.
13. *Electrol, December,* 1925.
14. *Grant, January,* 1926.
15. *Nu-Way, January,* 1926.
16. *Wayne, February,* 1926.
17. *May, February,* 1926.
18. *Ray Rotary, March,* 1926.



Burner Frame with Gas Pilot and Control Attached

19. Super Oil Heator



Motor and Atomizing Nozzle, With Gear Oil-Pump Below.

DESIGNED especially for use in round type boilers, but adaptable to rectangular water, steam or vapor boilers where the length does not exceed 1½ times the width, this burner, built by the Super Oil Heator Company, Hartford, Conn., will handle up to 600 sq. ft. of steam radiation, or equivalent. The Heator will efficiently burn a maximum of 3 gal. of oil per hour, and will show, under test, a flue gas CO_2 content of 14%.

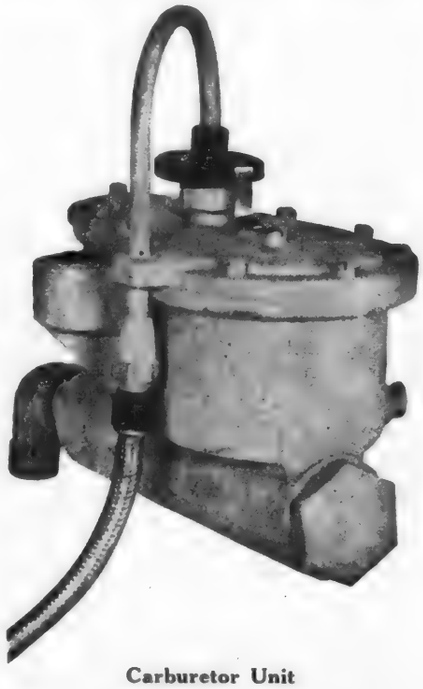
The burner unit proper consists of a 1/6 H.P. G. E. motor, slow speed type, mounted vertically on three coil springs, so that its shaft lies in the axis of the boiler. The shaft of the motor is hollow, and carries at its lower end one of a pair of gears acting as a pump, and, at its upper end a nozzle through which an oil-air mixture is thrown in a horizontal sheet when the motor is at speed.

The motor assembly is not rigidly set in its frame, but literally "floats" on the spring suspension. This feature, coupled with the use of a flexible oil-pipe lead from the carburetor to the gear pump, reduces to a minimum the transmission of motor noise or vibration to the boiler or furnace.

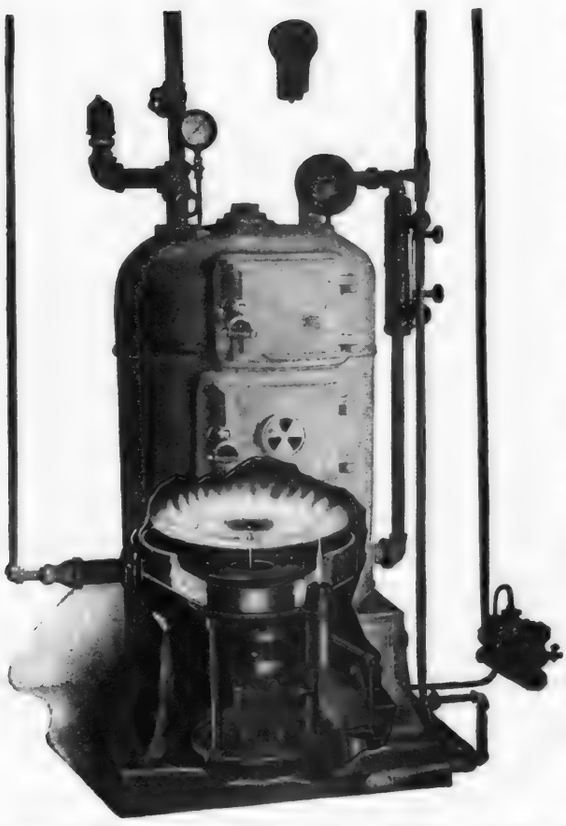
FLOAT FEED MAINTAINS OIL LEVEL

Outside of the boiler is installed the carburetor unit, which consists of a bowl in which fuel is maintained at a fixed level, by a float-controlled needle valve. Oil is fed to this chamber by gravity, through a strainer. Mounted directly over this needle valve is a piston in a cylinder. This piston, which weighs about 1¾ lbs., is held off the valve by the vacuum in the flexible hose between the carburetor and the motor-pump unit, permitting the float to actuate the needle valve and control the rate of flow of the oil. Immediately upon the stopping of the motor-pump unit, the vacuum in the pipe and cylinder above the weighted piston is destroyed, and the piston loads the float valve which is seated sufficiently tight to hold against a head of 300 ft. of oil. There is no "wire-drawing" of the oil at the valve seat, consequently no straining of the impurities out of the oil to lodge upon the seat. In case of failure of the needle valve properly to seat, a standpipe from the top of the float chamber is provided, the top of which is above the level of the top of the oil service-tank, so that no oil can get out of the system. This stand pipe acts as an air intake to the carburetor, and through it is drawn the primary air that passes to the gear pump at the foot of the motor shaft.

To install the burner, the grates are removed and the motor unit inserted



Carburetor Unit



Typical Boiler Section, Showing Installation of Super Heater Oil Burner

through the ash-door, in such a way that a circular casting called the base ring has its upper surface just above the grate line. After cutting and fitting a sheet-metal hearth plate, Plibrico, or a similar plastic refractory is formed into a bowl-shaped hearth, extending up along the walls of the boiler to a point just above the level of the atomizing nozzle.

The base ring forms a close fit with the material of the hearth, and through a hole in its centre passes the motor shaft carrying the nozzle. Into this base ring is inserted a set of air-adjusting and baffling rings for purposes of controlling or regulating the amount of air for combustion. Mounted axially with the motor shaft and on top of these air adjusting rings are four annular air pre-heating rings. These rings become hot from the radiant heat from the fire, and the fresh air for combustion is caused to pass between these pre-heating rings, the idea being to supply the combustion air uniformly distributed all around underneath the disc of fire and at a temperature which will facilitate rapid and efficient combustion. It is obvious that fuel can be thrown into the combustion chamber only when the motor is in operation. It is obvious that fuel can only be drawn into the combustion chamber when the motor is in operation, and, should the pilot fail to ignite the oil, the overflow is collected in a trough, with a pipe to a trip bucket, the dropping of which opens the motor circuit.

Ignition is normally through a gas pilot flame, continuously burning. The pilot is attached to the burner frame, and the gas tip projects through the base ring, and is surrounded by a collar to prevent trouble from air blasts. The pilot flame is small but long enough to project through the plane of atomization, making ignition reasonably certain.

As a precaution against failure of the pilot light, the surrounding chimney is a copper thermostatic element which is kept warm by the heat from the pilot-light flame. As long as the pilot-light flame keeps the thermostatic body warm, the switch in the housing at the bottom of the thermostat is held in the "on" position, but if the pilot light should become extinguished, the thermostatic element will cool off and open the circuit to the motor, making it impossible to operate the Heator while the pilot light is not burning.

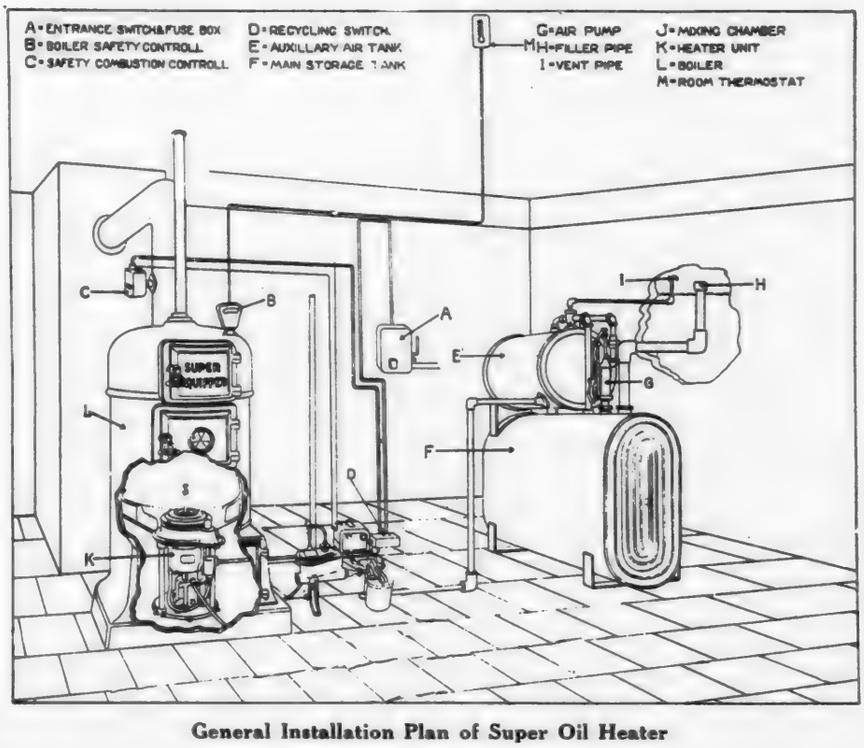
The installation of the Super Oil Heator in a home heating system is always made with standard protective means for stopping the motor in case the pressure or temperature of the system reaches a pre-determined point.

There are three adjustments for the proper regulation of the combustion of the fuel. The oil regulation is by knurled dial on the top of the carburetor: A by-pass valve is arranged between the suction and the pressure side of the pump by which variable percentages of air can be shunted back from the pressure side of the pump to the suction side, reducing the amount issuing from the nozzle. This by-pass valve is spring-loaded and is adjustable so that any rate of combustion from a half-gallon to three gallons of oil per hour may be secured. The third adjustment is the regulation of the main body of air for combustion and is effected by rotating the outer ring of the air-adjusting ring assembly. All these adjustments may be made while the Heator is in operation.

The Heator makes a disc-shaped fire, completely filling the fire pot. Air pressure from 3½ lbs. to 5 lbs. is used on the atomizing nozzle, producing a disc-shaped fire, filling the fire-pot.

The Super Oil Heator is built in two types. The "Type A" is available with gas or electric ignition and will operate successfully with any clean 28-32° A.P.I. free flowing, asphaltum base oil, or the equivalent. The "Type B" Super Oil Heator is listed as standard by the Underwriters' Laboratories and is sold to burn oil not heavier than 36° A.P.I., and uses a Honeywell DSS system of control. It also is provided with an Imperial trip bucket.

Unit construction has been followed throughout, it being possible to remove any unit from the frame without disturbing any other unit. The pump consists of two helical gears. The center distances of these gears can be adjusted while the Heator is in operation, thereby making it possible, if after years of operation the pump should lose some of its efficiency, to shift the gears sufficiently to restore the efficiency of the pump.


A - ENTRANCE SWITCH & FUSE BOX
B - BOILER SAFETY CONTROLL
C - SAFETY COMBUSTION CONTROLL
D - RECYCLING SWITCH
E - AUXILLARY AIR TANK
F - MAIN STORAGE TANK
G - AIR PUMP
H - FILLER PIPE
I - VENT PIPE
J - MIXING CHAMBER
K - HEATER UNIT
L - BOILER
M - ROOM THERMOSTAT
SUPER

General Installation Plan of Super Oil Heater

Oil-Burner Industry to Launch a Nation-wide Campaign

SOME idea of the comprehensive plans which have been made by the oil-burner industry to bring home to the householders of the country the advantages of house heating with oil is given in "The Story of the Oil-Burning Campaign 1926-1931," which has been prepared by the American Oil Burner Association. The three big objectives of the campaign are:—

1. To increase the use of oil burning in the domestic and industrial field.

2. To insure better sales, installation and service methods among established burner dealers.

3. To help member companies expand their present market and increase the number of their outlets.

In the preparation of the publicity and promotion plans, an investigation was made to determine whether there was a real necessity for advertising oil burning and if there was, where that advertising should be directed and what it should do. Investigation was carried on among architects, building contractors, home owners, builders of oil burners, oil distributors, consulting engineers, factory engineers and executives, oil-burner manufacturers and oil-burner dealers.

Among the suggestions received was that the campaign be directed to educate the public in the advantages of oil-burning, to make some kind of public defense against anti-oil-burning propaganda, to educate architects and building contractors in the merits of oil-burning because they can recommend for or against oil-burning, to help to eliminate the antiquated laws covering the use of oil as fuel and, finally, to supply dealers with constructive information that will help them sell, install and service burner equipment more intelligently and, therefore, more profitably.

Among architects and building contractors, the most pressing requirements, it was found, are for correct data and instruction statements on oil-burning, without reference to particular makes of burners, for data on installation methods, uses and general advantages of oil-burning and on information on cost of installation and operation.

In carrying out its plans, advertising activities to be conducted in the domestic field will originate with the association and will be distributed from association headquarters, from member manufacturers using material furnished by the association and from member established dealers, also using material furnished by the association.

The objective of the advertising from association headquarters will be to give general publicity with the idea of oil-burning among possible users of domestic equipment and among those trades and classes which can influence them. This will take the form of advertising in general and class magazines. The managers of the 4000 leading hotels and superintendents of the 3500 leading hospitals in the country will be reached by direct mail advertising. Architects, building contractors and heating contractors will be reached through their trade papers and magazines. This advertising is intended to be inquiry-producing and the association headquarters will be equipped to furnish detailed information about oil-burning for domestic purposes. In addition, it is proposed to furnish every architect, building contractor and heating contractor with a copy of the association's forthcoming reference and data book, "Hand Book of Domestic Oil Burning."

In addition, member companies as well as established dealers of member companies, will be furnished with follow-up material for general and local campaigns.

In the industrial field, a similar course will be followed. Although the plan for 1926 is extensive, the plans for the second, third, fourth and fifth years call for intensifying and broadening the first year's activities.

New Film on Manufacture of Wrought Pipe

THE ARTERIES OF INDUSTRY, the latest educational motion picture prepared by the National Tube Co., Frick Building, Pittsburgh, Pa., is announced in a circular issued by the company, accompanied by the statement that this motion picture is supplied without charge for educational purposes. The new film is intended to supplement the company's original motion picture on "From Ore to National Pipe." The new picture gives to both the layman and the engineer an intelligent conception of the manufacture of wrought pipe. Its presentation occupies a little more than an hour, portraying a series of operations that would require many hours of time and much travel to see personally. In addition to the actual mill scenes, many of the more important steps are illustrated graphically by animated diagrams. The descriptive circular contains many of the typical photographs included in the reel, showing the ore fields, the blast furnace, the Bessemer process, the open-hearth process, the blooming mill, the rolling mill, the butt-weld process, the lapweld process and the hammerweld process. Size 4 x 9 in. Pp. 16.

National Trade Extension Bureau's "Ask 'em to Buy" campaign is in full swing in accordance with the plans outlined at the Sales and Advertising Managers Conference last November. The idea is to give the heating and plumbing contractors each month one effective practical way of increasing their sales. The process of securing listings and follow up prospects by means of the Inspection Report Card has been covered. The next and logical step is "Compiling and Using a Mailing List Profitably." A set of four lessons on this subject, along with appropriate examination questions, has been prepared. Copies will be sent to anyone upon request, addressed to the N. T. E. B., at Evansville, Ind. A short talk has also been prepared on mail advertising which is especially suitable for delivery before groups or associations. T. E. B. monthly service bulletin for February contains many suggestions for advertisements especially adapted to "Ask 'em to Buy" campaign.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF THE HEATING AND VENTILATING MAGAZINE, published monthly at New York, N. Y., for April 1, 1926.

State of New York, County of New York, ss:

Before me, a notary public in and for the State aforesaid, personally appeared Arthur S. Armagnac, who, having been duly sworn, according to law, deposes and says that he is the editor of The Heating and Ventilating Magazine, and that the following is, to the best of his knowledge and belief, a true statement of said publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443 Postal Laws and Regulations printed on the reverse of this form to wit:

1. That the names and addresses of the publishers, editor, managing editor, and business managers are:

Publisher, Heating and Ventilating Magazine Co., 1123 Broadway, New York.

Editor, Arthur S. Armagnac, 1123 Broadway, New York.

Managing Editor, None.

Business Manager, Gustave Petersen, 1123 Broadway, New York.

2. That the owners are: (Give names and addresses of individual owners, or if a corporation, give its name and the name and address of stockholders owning or holding 1 per cent or more of the total amount of stock).

Heating and Ventilating Magazine Co., 1123 Broadway, New York.

Arthur S. Armagnac, 1123 Broadway, New York.

Gustave Petersen, 1123 Broadway, New York.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more or total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain, not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than of a bonafide owner and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

ARTHUR S. ARMAGNAC, Editor.

Sworn to and subscribed before me this 29th day of March, 1926.

A. L. SCANTLEBURY.

Notary Public, Kings Co., No. 800.

Certificate filed in New York County, Clerk's No. 717.

New York County Register's No. 7596.

(My term expires March 30th, 1927.)

Remote Control of Temperature

That none of the steam generated for heat should be sent to parts of the building where it is not needed, in the Bell Building, Chicago, a Pneumatic Switchboard for remote control of risers was installed.

By this means the engineer is enabled to control the heat to the best advantage. If a strong wind off the lake, for instance, calls for plenty of heat to be supplied to the east side of the building, the engineer throws the pneumatic switches controlling the risers on that side, opening those valves. At the same time air currents in the building may carry so much of that heat to other parts of the building that no heat supply will be required there. Therefore the engineer, through the Pneumatic Switchboard, closes the valves in certain other risers, thus conserving his steam, and consequently saving fuel.

How It Works

Each switch on the Board is numbered, the numbers corresponding to those on the diagram of piping around the front of the Board showing the riser valves.

This diagram approximates the ground plan of the building, which covers 65x130 feet of ground, so the engineer easily controls the supply of heat to the several sections of the building without leaving the engine room, and can send steam to the one or more portions needing it, without wasting any in those parts that do not require it.

This saves not only fuel but time and labor as well, and gives prompt service to the tenants.

Other Applications

This pneumatic control handles dampers and valves that would otherwise be almost or completely inaccessible.

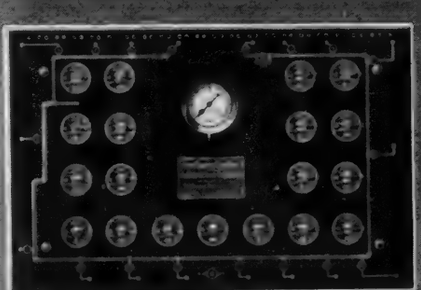
A ventilating system frequently comprises means of bringing in fresh air, exhausting used air, and also ducts and equipment which permit of recirculating the air within the building, under certain conditions. This calls for large dampers, usually of the louvre type—and these are often of varying sizes and very distant from each other. By the use of the Powers Pneumatic Switch the entire operation of these dampers can be localized on a switchboard placed conveniently in the engine room.

Send for This Book

The Powers Pneumatic Switch is of very sturdy construction, and can be relied upon to remain tight, and to function, indefinitely.

Upon request we shall be glad to send a copy of our book "The Elimination of Heat Waste," which tells more about this detail of the Powers System and gives further information regarding other types of Powers Control.

BELL BUILDING—CHICAGO
Architects: K. M. VITZTHUM
J. J. BURNS
Consulting Engineer: MARTIN C. SCHWAB
Heating Contractors: MEHRING & HANSON



PNEUMATIC SWITCHBOARD
For remote control of risers, as installed in the Bell Building.

John C. Erickson, Building Engineer, here controls supply of steam to all risers in the building.

THE POWERS REGULATOR COMPANY

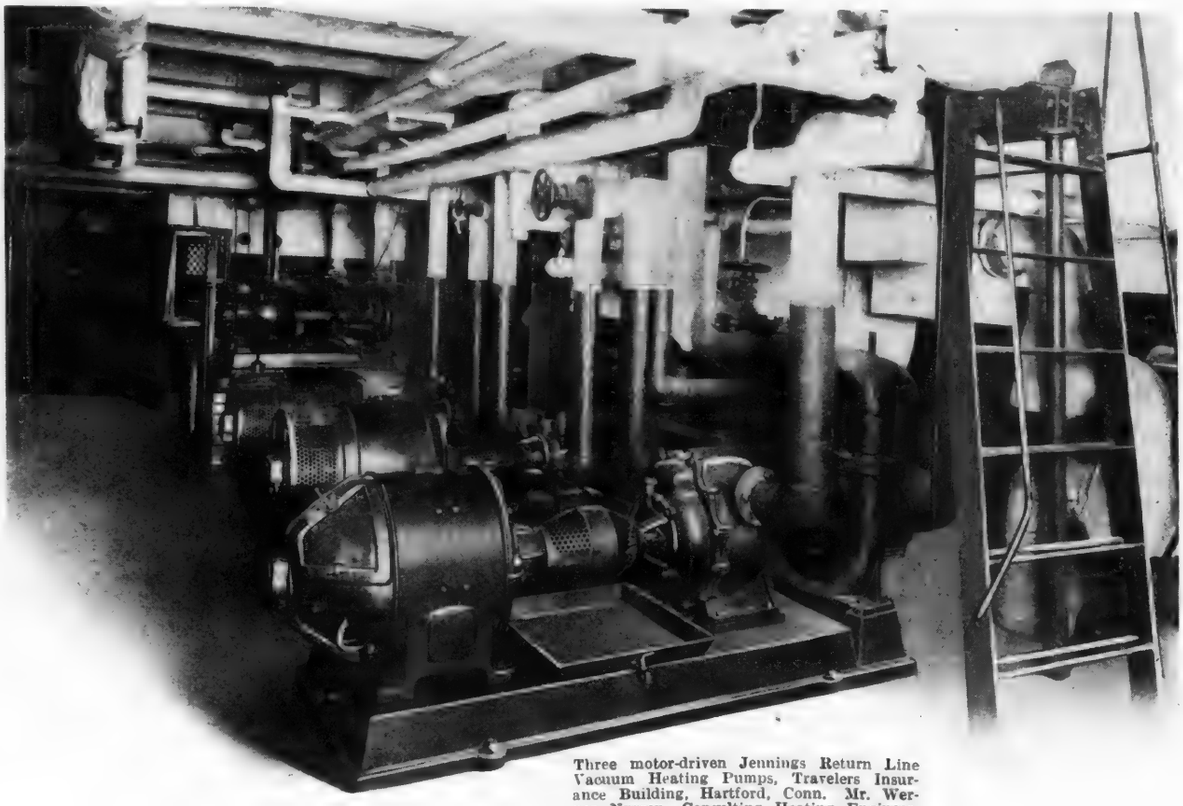
35 years of specialization in temperature control

2718 Greenview Ave., Chicago

Atlanta, Baltimore, Boston, Buffalo, Butte, Mont., Charlotte, N. C., Cincinnati, Cleveland, Denver, Des Moines, Detroit, El Paso, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, Minneapolis, Nashville, New Orleans, New York, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Seattle

CANADIAN OFFICES
Toronto, Winnipeg, Montreal, Calgary, Halifax, Vancouver

(3407)



Three motor-driven Jennings Return Line Vacuum Heating Pumps, Travelers Insurance Building, Hartford, Conn. Mr. Werner Nygren, Consulting Heating Engineer, New York, N. Y. Baker, Smith & Co., Inc., Heating Contractor, New York, N. Y.

Jennings for Travelers

In the Travelers Insurance Building, Hartford, Conn., as in other notable buildings throughout the country, Jennings Vacuum Heating Pumps are relied on for removing the condensation and air from the return line steam heating system.

The choice of Jennings is a logical one. For the only moving parts in a Jennings Pump are the impellers, and these revolve with ample peripheral clearance in the casing. There is no metal-to-metal contact that can cause wear, decreasing the vacuum. As a result, high efficiency is maintained season after season.

Another thing—the air is removed independently of the condensation. It is discharged directly to the atmosphere without back pressure,—a feature of operation which assures a material saving in motor power.

These two advantages — maintained vacuum and economy in power—make Jennings the supreme vacuum pump for return line vacuum heating service.

Our bulletin, describing in detail the unique principle of Jennings construction and operation, together with sizes and capacities, sent free on request.

NASH ENGINEERING COMPANY

SO. NORWALK CONNECTICUT

Branch Sales Offices: Atlanta, Boston, Buffalo, Chicago, Cleveland, Dallas, Denver, Detroit, Houston, Indianapolis, Kansas City, Los Angeles, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Richmond, St. Louis, Salt Lake City, San Francisco, Seattle, Washington. **In Canada:** Montreal, Toronto and Vancouver. **European Offices:** London, Eng., Norman Eng. Co.; Brussels, Belgium and Amsterdam, Holland, Louis Reijners & Co.; Oslo, Norway, and Stockholm, Sweden, Lorentzen & Wettre.

Jennings Pumps

RETURN LINE AND AIR LINE VACUUM PUMPS CONDENSATION AND CIRCULATING PUMPS

Trade and Miscellaneous Notes

Coming Events

May 26-28, 1926.—Semi-annual meeting of American Society of Heating and Ventilating Engineers, in Lexington, Ky.

June 1-3, 1926.—Seventeenth annual convention of the National District Heating Association, at Niagara Falls, N. Y. Headquarters at the Niagara Hotel.

June 1-4, 1926.—Thirty-seventh annual convention of the Heating and Piping Contractors National Association, at Washington, D. C. Headquarters at the Willard Hotel.

June 22-24, 1926.—Forty-fourth annual convention of the National Association of Masters Plumbers, at Louisville, Ky. Headquarters at the Brown Hotel.

Miscellaneous Notes

National Association of Plumbing and Heating Salesmen will hold its first annual convention at the Book-Cadillac Hotel, Detroit, Mich., May 27-29. The purpose of the convention is to accomplish among other things:

1. The imparting and exchange of business information.
2. The establishment and clarification of matters of policy.
3. Personal acquaintanceship within the organization.
4. Effecting a national stimulus.
5. The contribution of new ideas for the future betterment of the industries represented.

Although the convention is to be strictly a business meeting, there will be entertainment features such as three "Get-Together" luncheons, a banquet, and a "Bosses' Night." The theme of the convention is "The Betterment of Business Through the Betterment of Salesmanship."

St. Louis, Mo.—An ordinance to compel contractors to install flues conforming with the size of the house and the number of square feet of radiation is the first goal in a campaign begun by the St. Louis Chapter of the American Society of Heating and Ventilating Engineers against the smoke evil. E. B. Langenberg, president of the St. Louis Chapter, declared that 75% of the flues in St. Louis were inadequate for proper combustion and that this faulty construction was responsible for 99% of the smoke difficulty. Committees from 18 smoke abatement organizations of St. Louis were present at a meeting held March 9 to plan a campaign.

International Correspondence Schools, Scranton, Pa., have appointed Horace A. Frommelt, formerly assistant works manager of the Falk Corporation of Milwaukee, to act as consultant in the apprentice training division where he will devote his full time to the inauguration and development of apprentice training programs.

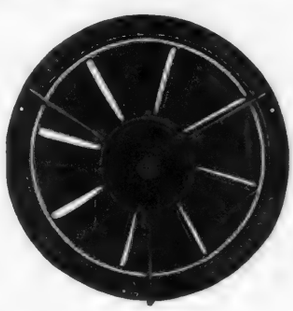
Chicago Association of Consulting Engineers elected the following officers at its recent annual meeting: President, John Small; vice-president, I. E. Brooke; secretary-treasurer, George A. Muir. At this meeting it was voted that the society call a meeting of the various organizations in Chicago interested in good ventilation for buildings, and in amending or changing the present ventilating code of the city.

National Fire Protection Association will hold its thirtieth annual meeting in Atlantic City, May 10-13. Included in the reports will be one on building construction, with special reference to industrial building, and on flammable liquids, with special reference to fuel-

For Those Hot Weather Days Ahead

This is the Fan to SELL!

EXCLUSIVE PATENTED FEATURES



RIGIDLY GUARANTEED THROUGHOUT

AUTOVENT—*"The Well-Built Fan"*

MOTOR—The enclosed, protected type motor is of special Autovent design. It is radiation cooled by patented process.

BEARINGS—Constructed of cast bronze alloy having large wearing surface. Self-aligning and interchangeable.

WHEEL—Bored and reamed hub to which steel spokes are securely riveted. Blades and spokes oxy-acetylene welded and riveted to outer rim. All wheels accurately balanced.

SHAFTS—The shafts are of extra quality shaft steel and are ground to fit the bearings.

INSTALLATION—Easiest to install. Fan frame can be installed separately, allowing motor and wheel to be inserted later. The weight of fan for installing is thus greatly reduced.

GUARANTEE—The complete unit, fan and motor, supplied and rigidly guaranteed by us. You can rely on us for absolute responsibility.

AUTOVENT FAN & BLOWER CO., 730-738 W. Monroe St., CHICAGO

OFFICES IN ALL PRINCIPAL CITIES

oil burning equipment and gasoline tank truck. Headquarters will be at the Hotels Chalfonte-Haddon Hall.

National Trade Extension Bureau, Evansville, Ind., has issued a series of four short lessons on "How to Use Mail Advertising" in connection with its "Ask 'em to Buy" campaign among heating contractors and master plumbers. These lessons, as well as suitable talks, it is stated, will be supplied free upon request of associations as suitable material of educational value and to all individuals who desire to learn mail advertising. A great many manufacturers and wholesalers of heating and plumbing material, it is stated, have secured a sufficient number of these lessons to supply their salesmen, in order that they may outline suggestions to their customers, the heating contractors or master plumbers.

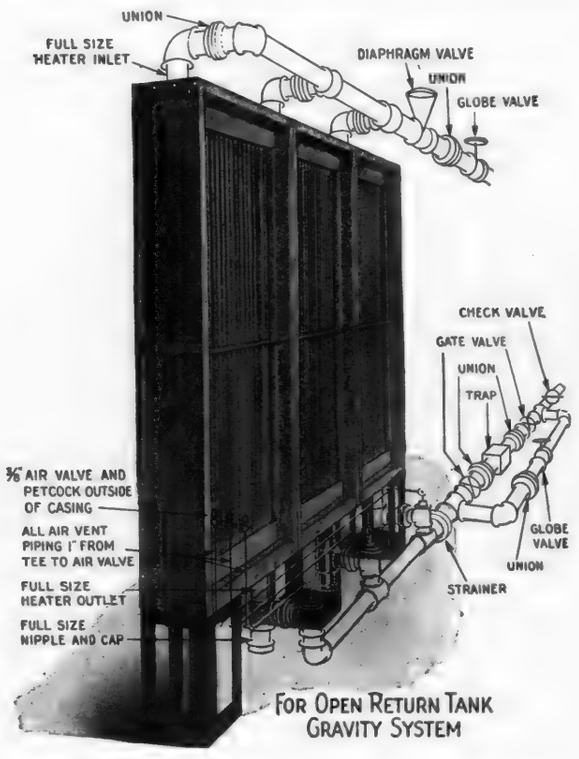
National Association of Master Plumbers, whose national convention is to be held in Louisville, Ky., June 21-26 announces that its exhibition will be held in the Kosair Temple, instead of in the Armory Building, due to the fact that there was not sufficient time to construct and decorate the booths between the meeting of the Turnfest and the Master Plumbers' Convention. The Kosair Temple, it is stated, is admirably adapted for exhibition hall purposes and will serve as an assembly room and convention hall, as well as an exhibit hall. One of the principal features of the convention will be a visit to the Louisville works of the Standard Sanitary Manufacturing Company, which is known as the largest enamel and brass plant in the world devoted to the manufacture of sanitary plumbing fixtures and appliances.

Building Operations for March, 1926, according to the F. W. Dodge Corporation, were the largest for any March on record. Last month also had a larger volume of contracts than any previous month except August of last year. The month's total of building and engineering contracts in the 37 States east of the Rocky Moutains was $597,879,300. The increase over February was 53%; over March of last year, 22%. Included in the month's record were $262,643,500, or 44% of all construction for residential buildings; $108,812,400, or 18% for commercial buildings; $100,103,300, or 17% for public works and utilities; $48,677, or 8%, for industrial buildings, and $29,079,700 or 5% for educational buildings. Total construction commitments made during the first quarter of 1926 have amounted to $1,444,937,700. This is an increase of 30% over the first quarter of last year.

In New York State and northern New Jersey, the figures came to $157,650,200. This was a 50% increase over February and an 88% increase over March of last year. In New England, construction contracts totaled $34,594,800, a 76% increase over the preceding month and a 1% decrease from March of last year. In the Middle Atlantic States, the construction contracts came to $68,798,500, an increase of 153% over February and 6% over March of last year. In the Pittsburgh district, there was an 88% increase over February, but at the same time, an 18% decrease from March of last year. The contracts totaled $87,004,600. In the Central West, the total was $130,187,300, an increase over February of 53%, but a decrease of nearly 3% from March of last year. In the southeastern States, the figures came to $86,480,300, an increase over February of a little more than 1%, and over March of last year of 71%.

In the northwest, the March building and engineering contracts reached a total of $12,084,100. This was the highest monthly total recorded for the district since last June. It was 128% above the figure for February and 67% above March of last year. Texas had $21,079,000 in contracts for new building and engineering work, this being more than double the amount for March of last year and 30% more than February of this year.

National Pipe and Supplies Association will hold its annual convention June 1-3, at White Sulphur Springs, W.



AEROFIN CORPORATION
750 Frelinghuysen Avenue
Newark, N.J.
L. C. Soule, *Sec'y and Sales Manager*

AEROFIN

Fan-System Heating Surface

To Engineers, Architects and Contractors

THREE YEARS OF SUCCESSFUL SERVICE demonstrates that AEROFIN has established itself as a dependable product.

ENGINEERS OF NATIONAL REPUTATION AND TWENTY YEARS' EXPERIENCE WITH FAN SYSTEM HEATERS, are responsible for the design, development, manufacture and marketing of AEROFIN, and their services are at your command to assist you in working out your heating, ventilating, cooling and drying problems.

SINCE THERE IS NO EQUAL TO AEROFIN, WHY NOT SPECIFY IT OUTRIGHT? Plans and specifications should show sizes and number of units, with piping details.

AEROFIN HAS A TREMENDOUS ADVANTAGE in its LIGHT WEIGHT. AEROFIN weighs only 9% to 25% as much as the old-fasioned heavy heaters. AEROFIN SAVES A GREAT DEAL OF SPACE.

AEROFIN IS MADE OF NON-CORROSIVE METALS. This feature meets with universal approval.

THE INSTALLED COST OF AEROFIN IS GENERALLY LESS than that of cast-iron heaters and pipe coils. AEROFIN (completely encased) can be erected in the same number of HOURS as is required in DAYS to erect the heavy heaters. This means a great saving in erecting cost.

THE INSTALLATION OF AEROFIN WITH VERTICAL TUBES IS RECOMMENDED as this arrangement is less subject to errors of installation and operation. THE HORIZONTAL TUBE ARRANGEMENT is satisfactory when installed in accordance with our instructions and diagrams.

Write for catalog, instruction leaflet and service details.

Aerofin is Sold ONLY by Manufacturers of Nationally Advertised Blower Heating Apparatus.

Johns-Manville Underground System of Insulation

The Trench. This one presented particular difficulties because of many springs and some quicksand.

Laying the underdrain in the sub-trench. One underdrain for each run of conduit.

Centering lower half of conduit after a substantial bed of gravel has been provided.

Setting roll frames in concrete piers. These frames support the piping and permit free movement in expansion.

Welding piping strengthens joints and makes them tight. After welding, pipes are thoroughly tested with water under pressure, for leakage.

Tops applied. The lower half of conduit already contains Asbesto-Sponge Conduit Filling. Lower and top halves matched by number.

Asbesto-Sponge Filler being rammed in between the top and the piping. This insulation is the most efficient of its kind.

Cementing the bell joints further seals the conduit and makes it completely watertight.

Additional gravel is placed in the trench above the level of the side joints. After backfilling and grading, the system is ready for use.

THE efficiency of the Johns-Manville Underground System of Insulation for steam and hot water pipes is usually well over 90%. Hundreds of installations throughout the United States and Canada have shown the efficiency of this system to be permanent and dependable. Carefully and securely laid, these systems operate for many years with little or no maintenance expense.

JOHNS-MANVILLE, INC., 292 MADISON AVENUE AT 41st STREET, NEW YORK CITY
Branches in all large cities. For CANADA: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

Asbestos and its allied products
INSULATION
BRAKE LININGS
ROOFINGS
PACKINGS
CEMENTS
FIRE PREVENTION PRODUCTS

JOHNS-MANVILLE

Va. Headquarters will be at the Greenbriar Hotel.

Chicago's "Own-Your-Home" Exposition, March 27-April 3, was held co-incident with the severe storm which swept the West at that time. While the storm affected the attendance to some extent, on the other hand, it brought home, in a very convincing manner, the essential requirements of adequate heating equipment. Among the speakers at the exposition, some of whom had their talks broadcast by radio, were Harry M. Hart, L. H. Prentice Co., Chicago, whose subject was "Certified Heating for the Home"; Dr. E. Vernon Hill, whose subject was "Home Ventilation"; and Samuel R. Lewis of Chicago, who talked on "The Value of Insulating a Home". An article devoted to the explanation of the comfort zone, written by A. B. Martin of the Chicago branch of the Kewanee Boiler Company and president of the Illinois Chapter of the American Society of Heating and Ventilating Engineers, was distributed at the Exposition. Among the exhibitors, the Chicago Master Steamfitters' Association had a booth at which certified heating was prominently featured. Several of the better-known types of oil burners were shown, as well as boilers, radiators and similar equipment, together with insulation and weather strips, water heaters, thermostats and radiator covers.

Washington, D. C.—An important census of domestic oil-burner manufacturers will be made during the present year by the Bureau of the Census, Department of Commerce, Washington, according to a statement by Director W. M. Stewart. Production statistics, including output and stocks of burners on hand, will be obtained and the figures published in the Commerce Order Book, and Biennial Census of Manufacturers. The burners will be classified as of the forced and natural draft types.

Manufacturing Notes

A. H. Wolff Gas Radiator Co., New York, announce that the company's name has been changed to American Gas Products Corporation in order more clearly to define the extent and variety of the gas-heating equipment manufactured. The company will continue as sole distributor of Ideal gas boilers, manufactured by the American Radiator Company, and will continue its present line of gas appliances, which includes warm-air gas radiators, radiant heaters, and urn burners. The headquarters office will continue at 376 Lafayette Street, New York.

Cleveland Gas Burner & Appliance Co., Cleveland O., is bringing out a new line of Barber jet burners, which have been undergoing tests during the past year. These new burners will be manufactured in twelve designs having gas capacities ranging from 6 cu. ft. to 250 cu. ft. per hour with 3-in. gas pressure. The burners while embodying the Barber patented jet principles, are unique in design in that they produce a shorter flame than the present types, which is desirable in many applications. Other models and designs are under way to meet the requirements of special appliances.

Goulds Mfg. Co., Seneca Falls, N. Y. announces a change in its corporate name to Goulds Pumps Inc. This change was made so that the company's product, Goulds pumps, would be linked more closely with the company's name. In 1869, when the company was incorporated, a wide variety of products was manufactured, but to-day its sole output is pumps. There has been no change in organization, business policy or ownership. The change in name became effective April 1, 1926.

Uehling Instrument Co., Paterson, N. J., announces the appointment of W. B. McBurney, 619 Trust Company of Georgia Building, Atlanta Ga., to serve as representative for Georgia and Eastern Tennessee in the sale of Apex Co_2 recorders and indicators, fuel waste meters, and combined barometer and vacuum recorders.

Ingersoll-Rand Co., New York, announces the appointment of Harlan A. Pratt as manager of its oil and gas engine department. Mr. Pratt was connected for many years with the sales department of the Westinghouse Elec-

Western States Life Insurance Co.
San Francisco

Reed Brothers
Architect

Chas. T. Phillips
Engineer

U. S. Controlled Ozonizers are insuring comfort and efficiency for the employees of the Western States Life Insurance Co., at their Home Office.

Ozonized Air is Pure Air.

MONTGOMERY BROTHERS

Chicago
500 No. Dearborn St.

San Francisco
61 Fremont St.

New York
50 Church St.

General Sales Agents for

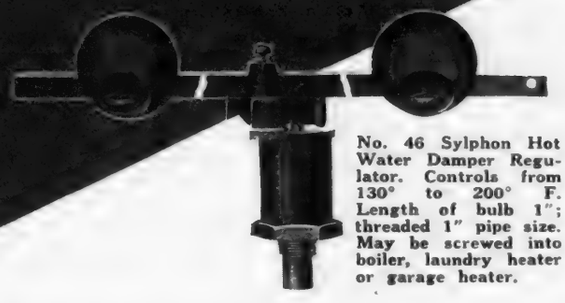
THE UNITED STATES OZONE COMPANY

General Offices and Laboratories: 500 No. Dearborn St., Chicago.
Factory: Scottdale, Penna.

Sylphon
TRADE MARK

Hot Water Damper Regulators

Cut: open view of No. 45-A Sylphon Hot Water Damper Regulator. Controls from 120 degrees to 240 degrees F. Length of bulb 2 inches; threaded ¾-inch pipe size. Installed in a T or screwed into boiler.



No. 46 Sylphon Hot Water Damper Regulator. Controls from 130° to 200° F. Length of bulb 1"; threaded 1" pipe size. May be screwed into boiler, laundry heater or garage heater.

House heating water boilers need control the same as steam boilers

An uncontrolled hot water heating system that overheats your customer's house causes just as much discomfort and wastes as much fuel as an uncontrolled steam system would.

A Sylphon Hot Water Damper Regulator will **automatically** open and close the drafts in quick and direct response to changes in water temperature. It will assist in keeping the house temperature constant at the desired point.

Use Sylphon Hot Water Damper Regulators on the hot water heating systems you install. They assure life-long control **without servicing** costs..

This diagrammatic cut shows the flexibility and large extent of expansion and contraction of the Sylphon bellows, originated, patented and manufactured solely by The Fulton Company. Insist on the genuine. Refuse imitations.

The secret of their accurate, lifelong control

All Sylphon Damper Regulators contain the well known Sylphon Bellows as their diaphragm—the most **sensitive, flexible** and **durable** expansion unit known to engineering science.

Ask for Bulletin WDR-5

This can be done hundreds of thousands of times—
AND NO APPRECIABLE LOSS OF FLEXIBILITY WILL DEVELOP IN THE ALL METAL-SEAMLESS SYLPHON BELLOWS
Sylphon

THE FULTON COMPANY KNOXVILLE, TENN.

ORIGINATORS AND PATENTEES OF THE SYLPHON BELLOWS

Sales Offices in New York, Chicago, Detroit, Boston, Philadelphia and principal cities in U.S.

European Representatives: Canadian Representatives:
Darling Bros., Ltd.

tric & Manufacturing Company and later served as sales manager of the Atlantic Elevator Company.

Richmond Radiator Co., New York, announces the opening of a large warehouse in the Defender Building, Pierson and Meadow Sts., Long Island City, N. Y., where a complete stock will be carried of the company's products to serve the territory of Long Island, Manhattan, Bronx, Westchester and Brooklyn.

Fitzgibbons Boiler Co., Inc., New York, has taken new quarters at 570 Seventh Avenue, at 41st Street, New York. The new quarters will give more than double the floor space of the former offices.

Sarco Co., Inc., New York, has moved its offices to 183 Madison Avenue at the corner of 34th Street, New York.

McGee Furnace Co., Boston, Mass., has moved its headquarters to its plant in Taunton, Mass. The company will maintain a showroom, however, at the Boston address, 38 Union Street.

William H. Page Boiler Co., New York, has moved to new quarters at 200 Madison Avenue, between 35th and 36th Streets, New York. W. P. Davenport is vice-president and general manager.

Autovent Fan & Blower Co., Chicago, Ill., announces the following appointments: R. P. Kelley, an experienced ventilating engineer, as manager of the Florida office, 221 LaFayette Arcade Bldg., Tampa, Fla.; the Scott-Jacqua Co., Inc., Indiana Terminal Warehouse Bldg., Indianapolis, Ind., as Indiana sales representative; M. C. Hengst, 415 Building & Loan Bldg., Grand Rapids, Mich., as sales representative; Charles M. Setzer, 715 Independence Bldg., Charlotte, N. C., as sales representative.

Sarco Co., Inc., New York, has found its old quarters in the Woolworth Building too small to accommodate its increased business and is now installed at 183 Madison Avenue, where the company carries a complete stock of the Sarco line of steam traps, radiator traps, temperature regulators, strainers, and packless inlet valves.

Patterson-Kelley Co., 101 Park Ave., New York, has acquired the business, good-will, patents, patterns, and all rights of the Otis Heater from the King Construction Company, which firm recently acquired the business of the Stewart Heater Company, formerly of Buffalo, N. Y. The Patterson-Kelley Company will continue to manufacture all types of Otis heaters and announce that they are in a position to furnish repair parts promptly for all old equipment of this make.

Parr Metal Products Corp., 3519 41st St., Long Island City, N. Y., announces a complete line of steel radiator inclosure cabinets. A catalogue describing these products is now in preparation.

Johnson Fan & Blower Co., 169 May St., Chicago, has moved into a building at 1319-25 West Lake Street, Chicago, with 51,000 sq. ft. of floor space. These quarters occupy six times as much area as the company's previous quarters. Howard Porter, 310 Stuyvesant Bldg., Cleveland, O., was recently appointed to be the company's representative in the Cleveland territory.

Art Metal Radiator Cover Co., Chicago, has appointed as its chief engineer, G. S. Faber, formerly connected with the General Electric Co., Westinghouse, Church, Kerr & Co. of New York and the American Radiator Co., of Chicago. The Art Metal Radiator Cover Company, has successfully marketed for the past eight years a radiator humidifier under the name of Trico. Mr. Faber enters the organization with a system of automatic humidification upon which he has procured three basic patents. A description of Mr. Faber's humidifying system appears on another page of this issue. Additional capital has been subscribed, mostly by members of the organization, and the company's new factory at Kolmar and Grand Avenues, Chicago, has been equipped for large scale production.

Everhot Heater Co., Detroit Mich., began, May 1, the operation of five offices in Chicago. The central office is located in the Garland Building and the other four are conveniently located to serve different sections of the city. Herbert W. Eggert has recently been associated with the company and will act as manager of the South Side office.

Gorton & Lidgerwood Co., New York, reports a large increase in the number of installations of the Gorton single-pipe vapor heating systems in New England secured through the company's Massachusetts sales office, C. W. Bedell, 101 Tremont St., Boston.

C. A. Boyle & Co., Chicago, has opened an additional factory in New York to take care of the increased production required by the company's growth. C. A. Perry, vice-president, is in charge of the Chicago plant. Emory C. Perry, president, is dividing his time between the various plants and sales branches. R. M. Stuart is in charge of production of the Chicago plant, and E. Bond has been appointed production manager of the New York plant.

American Blower Co., Detroit, Mich., has entered into an arrangement with John T. Nesbitt, Inc., Atlantic City, N. J., manufacturer of the Universal line of portable heating and ventilating units, whereby the Universal system will be handled by the nation-wide American Blower sales offices and organization.

Hart & Crouse Co., Utica, N. Y., has recently opened a new office at 207 Fulton Bldg., Pittsburgh, Pa., and a new warehouse at 49 Central Ave., Cincinnati, O., where the company will carry a full line of its boilers. The Cincinnati office still remains at 702 Union Trust Bldg., with Cooper Pogue in charge.

Wm. H. Page Boiler Co., New York, announces the removal of its showroom and general offices to 200 Madison Avenue, between 35th and 36th Streets, New York.

National Radiator Co., Johnstown, Pa., has started construction work on its new general office building in Johnstown. The new structure is located on a beautiful plot of ground two blocks distant from the company's present plant. The building will be of brick, hollow tile, concrete and steel construction, 80 ft. wide by 120 ft. long, and will be fireproof in every respect. Contracts let so far this year include, in addition to the new office building, the construction of a new warehouse at Richmond, Va., and expansion of the company's plant at New Castle, Pa.

Hoffman Specialty Co., Inc., announces the appointment of P. M. O'Connell as district sales representa-

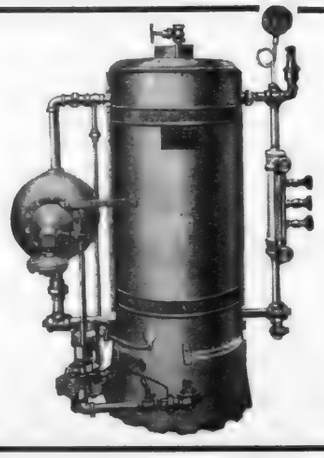
OFELDT GAS BOILERS

Raise Steam in 4 Minutes—Cost Less to Operate

On that next job specify the Ofeldt

Whether your customer requires only 5 or 150 lbs. of steam working pressure—OFELDT Gas Boilers will never fail to satisfy. Their record of low cost of operation in thousands of plants, their dependable automatic control, have made it possible to enjoy the use of gas. Raising steam in four minutes, saving space, labor and improving the working conditions are items that every plant owner is interested in. The OFELDT Automatic Gas Boiler makes this an actual reality. Made in sizes 1 to 25-H.P.

Write today for full particulars



Ofeldt Gas Boiler Sales Corp.

St. Louis, Mo. 2010 Locust St. | **363 W. Erie St., Chicago, Ill.** | Birmingham, Ala. American Trust Bldg.

Smooth out Troubles with Rough Walls

WHY let uneven walls run up the time-costs on installing column-radiators? The new Grinnell Column Radiator Brackets have only three points of contact. They save the time usually wasted in trying to properly adjust ordinary brackets.

Moreover, just one bolt is required to secure them firm and fast to the wall. And this bolt can be set without extremely accurate measurements, for the range of adjustability on the Grinnell Bracket is unusually wide—both vertically and horizontally.

Send for pamphlet giving illustration, description, dimensions and list of sizes in this sturdily made time saver. Address Grinnell Company, Inc.,—275 West Exchange Street, Providence, R. I.

GRINNELL

Fittings, Hangers, Valves, Pipe Bending Welding, Piping Supplies, Etc.

tive covering the States of Washington, Oregon, northwestern Idaho, and in Canada,—Vancouver, B. C. and Victoria, B. C. Mr. O'Connell's headquarters are at 5749 31st St., N. E., Seattle, Wash. O. E. Davis, with headquarters at Box 231, Scottsbluff, Neb., is now representing the Hoffman Specialty Company, in the States of Utah, Colorado, Wyoming, Nebraska and southern Idaho.

W. A. Russell & Co., Grand Central Terminal, New York, have appointed Henry W. Reis as vice-president and general manager of the company. Mr. Reis was formerly general sales manager. With the increasing of the sales force, Thomas E. Crone, for many years connected with the trade, becomes district sales manager in charge of the metropolitan district. Arthur S. MacLaren, recently appointed to the sales force, will cover the Greater New York territory. Mr. Reis will continue in charge of sales in addition to his new official duties.

American Schaeffer & Budenberg Corp., Inc., Brooklyn, N. Y., announces the adoption of the name of American for all of its products, which are now manufactured under the name of American, Ideal, Columbia, Crescent, Reform, American S & B, Honeco, Redline, American-Thompson and Simplex. This step is taken to eliminate the confusion resulting from the inheritance by the company of various products manufactured by the American Steam Gauge & Valve Manufacturing Company, the Schaeffer & Budenberg Manufacturing Company and the Hohmann-Nelson Company.

James P. Marsh & Co., Chicago, Ill., has leased a new four-story building at 2073-2081 Southport Avenue from the Justrite Manufacturing Company and will shortly move its offices to the new location. The building contains 40 sq. ft. of floor space and will provide ample accommodations for general offices, exhibition rooms, warerooms, shipping and other departments. James P. Marsh & Company are among Chicago's oldest manufacturing concerns, its business having been established in 1865 and incorporated in 1909. The company's line of steam specialties includes gauges, valves and traps.

Walworth Co., Boston Mass., announces the resignation of W. P. F. Ayer as vice-president, in charge of sales. Mr. Ayer retires after thirty-five years of active service with the company. His resignation will take effect sometime next summer, but he will continue to act as one of the directors of the company. He will be succeeded by Prentiss L. Coonley, whose headquarters will be in New York, in the Vanderbilt Building. The company is planning to move its general sales offices to New York in the near future and to establish additional headquarters in various zones of the country.

American Gas Products Corp., New York, distributors of Ideal gas boilers and manufacturers of other gas heating equipment, has appointed W. L. Hoyt as its representative on the Pacific Coast. Mr. Hoyt was formerly engineer with the Industrial Department of the Rochester Gas & Electric Corporation in the house-heating division. He is a graduate of Williams College, class of 1919.

New Corporations

American Engineering & Sales Corp., 1317 F St., N. W., Washington D. C., is the title and address of a new organization consisting of Walter N. Polakov, president; Wallace Clark, vice-president and secretary; I. B. Richman, treasurer; and Marion Butler, retaining counsel. The company's service will include: Engineering,—reports on foreign methods and processes, development and designing of power plants, equipment of manufacturing plants, research and investigations; management—organization of manufacturing branches abroad, securing and training personnel, investigations and reports. The company will also undertake patent searches and validity investigations, serve commercial interests in the matter of financing and credits, and overlook foreign concessions.

TWINFAN Unit Heaters

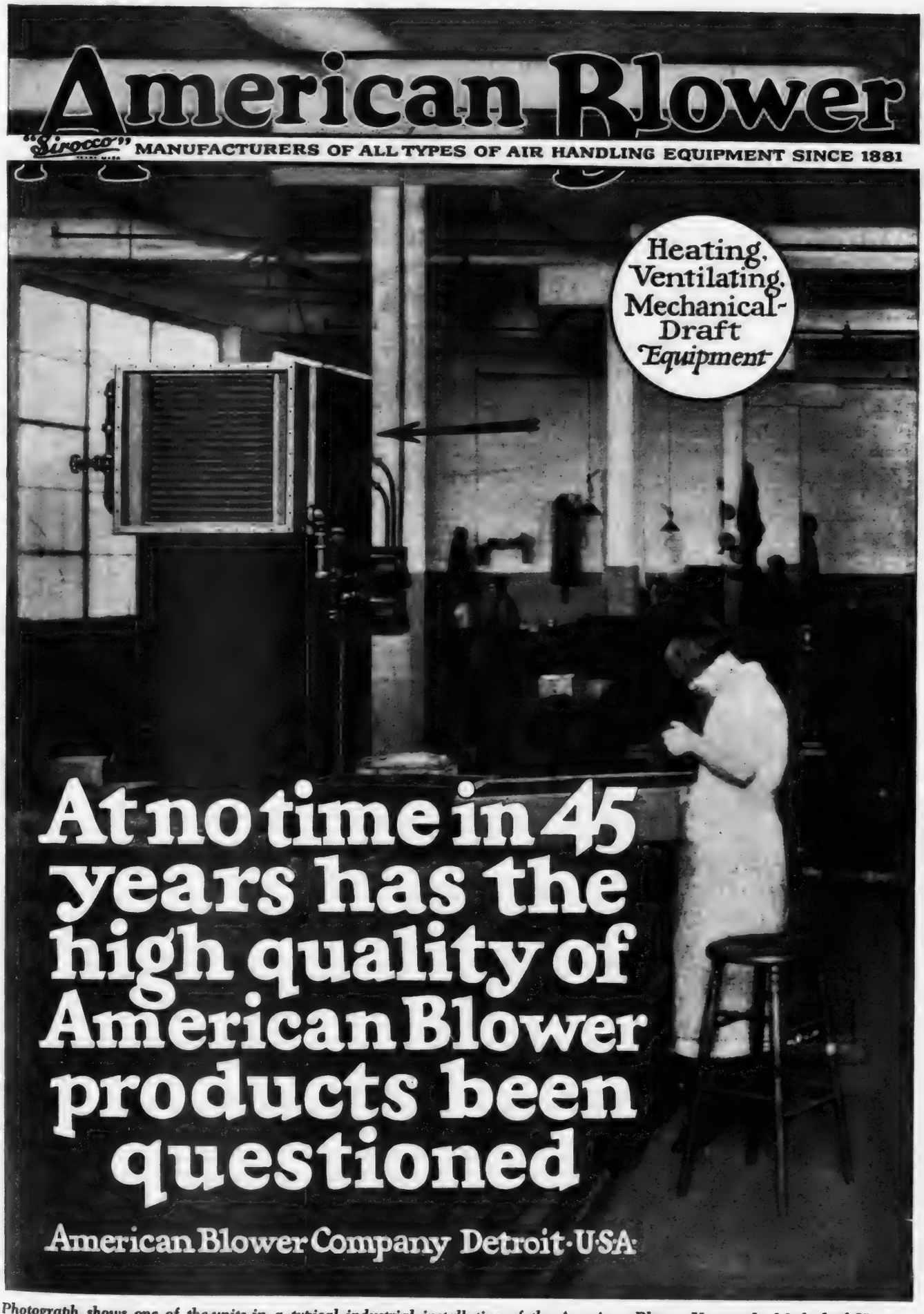
What Do Your Customers Think of Their Heating System NOW?

THIS changeable Spring weather tests the economy of an industrial heating system as the extreme temperatures of winter test its capacity. A direct radiation installation that has given satisfactory service all winter may call down curses from the big boss when he sees how much it costs him to heat his plant after he thought the heating season was over.

But the TwinFan installation meets the economy test just as it meets the requirements for capacity. The TwinFan provides the heat when and where it is wanted and in the proper amount. No valves to struggle with. A turn of the switch and the heat is on or off. It may be changed a dozen times a day. The men gladly regulate it because it is actually easier than opening windows—the old heat-wasting method.

If your customers don't know about the TwinFan System, you will help them and help yourself by telling them. Let us cooperate with you on your next industrial heating job.

DWYER EQUIPMENT COMPANY
4534 W. NORTH AVE. CHICAGO, ILL.


American Blower
"Sirocco"
MANUFACTURERS OF ALL TYPES OF AIR HANDLING EQUIPMENT SINCE 1881
Heating, Ventilating, Mechanical-Draft Equipment
At no time in 45 years has the high quality of American Blower products been questioned
American Blower Company Detroit·U·S·A·

Photograph shows one of the units in a typical industrial installation of the American Blower Venturafin Method of Heating

Sales Corporation are located at 25 Fifth Avenue, New York, and in the Rialto Bldg., San Francisco.

Plumbers' Supply Co., Fond-du-Lac, Wis., capital $50,000, to deal in heating and plumbing goods. Incorporators: F. Ryan Duffy, F. F. Duffy and William J. Ryan.

Contracts Awarded

C. A. Hunter, Alexandria, La., heating and plumbing a new high school in Baton Rouge for $41,107.00.

Montries & Montries, heating Carroll Peak School for $40,333.33. The plumbing contract went to the George Plumbing Co. and it cleared out $8,192.50.

"Readers Announcement"

Our Educational Service is being extended to readers of THE HEATING AND VENTILATING MAGAZINE. It is for Manufacturing and Contracting folks, as Employers, Draftsmen, Salesmen, Mechanics, Clerks, Apprentices, etc.

Since 1910 the St. Louis Technical Institute has taught quite an army of folks desiring to improve their opportunities. Our courses are Modern, Comprehensive and Official, and designed to give you those higher, finer touches your profession requires.

We Teach You In Your Own Home, Personal, Clear, Direct.

Our School Directory sent Free to interested parties. Indicate your Course when writing.

HEATING VENTILATING ENGINEERING
SPECIAL STEAM AND WATER HEATING
PLUMBING DESIGN AND INSTALLATION
WARM AIR HEATING
CONTRACTING AND ESTIMATING
MECHANICAL DRAFTING

Start with the 1925-26 School Season

ST. LOUIS TECHNICAL INSTITUTE
4541 Clayton Ave., St. Louis, Missouri

WANTED

Advertisements under this heading, $2.00 per inch, payable in advance. A 1-in. advertisement contains 35 words. To secure insertion copy must be received not later than the 20th of the month preceding date of issue.

POSITION WANTED.—Experienced installation superintendent and heating estimator desires to make connection with heating contracting concern. Prefers western location. Address Box 55, care of Heating and Ventilating Magazine.

ENGINEER WANTED.—Heating engineer and estimator, capable of estimating and superintending heating and ventilating. Power piping experience preferred. Excellent opportunity with well-established firm located in Ohio. References required. Address Box 51, care of Heating and Ventilating Magazine.

SALES REPRESENTATIVE WANTED.—Radiator and boiler concern has opening for heating salesman in Western Pennsylvania and Eastern Ohio district. All applications will be treated as strictly confidential. Address Box 52, care of Heating and Ventilating Magazine.

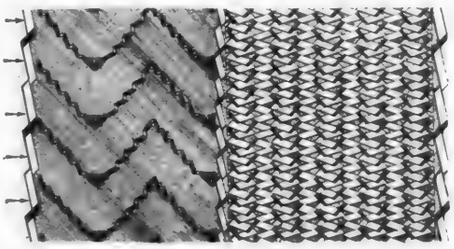
MANUFACTURER'S REPRESENTATIVE.—Manufacturer of complete line of fans, air washers and unit heaters desires recognized representatives on commission basis. Address Box 53, care of Heating and Ventilating Magazine.

POSITION WANTED as manager of heating contracting firm in New York. Fully conversant with selling, estimating, costs and labor organizations. Salary and profit-sharing basis only. Can secure good volume of business. Address Box 56, care of Heating and Ventilating Magazine.

MANUFACTURER'S REPRESENTATIVES.—Representatives wanted throughout the country to call on architects, engineers and heating contractors, to sell an air filter possessing unusual advantages over present types on the market. Address Box 54, care of Heating and Ventilating Magazine.

MANUFACTURERS' REPRESENTATIVES WANTED WHO ARE NOW CALLING ON THE HEATING TRADE ARCHITECTS AND ENGINEERS IN WASHINGTON, BALTIMORE, DOVER, PHILADELPHIA, PROVIDENCE, MANCHESTER, PORTLAND, BUFFALO, PITTSBURGH, CLEVELAND, TOLEDO, CINCINNATI, INDIANAPOLIS, AND ST. LOUIS, TO SELL A HIGH-CLASS MAGAZINE-FEED BOILER THAT REDUCES THE EXPENSE OF HEATING BY BURNING THE SMALLER SIZES OF COAL AND COKE, BESIDES OFFERING UNMATCHED OPERATING CONVENIENCE. STRAIGHT COMMISSION BASIS, WITH INCOMES ONLY LIMITED BY EFFORTS SPENT. CAN BE WORKED PART TIME AT FIRST, BUT WILL SHORTLY OUTGROW YOUR PRESENT CONNECTION. OUTLINE FULLY EXPERIENCE, ETC., FURNISHING SEVERAL REFERENCES IN MAKING REPLY. ADDRESS BOX 44, CARE OF HEATING AND VENTILATING MAGAZINE, 105 SOUTH DEARBORN ST., CHICAGO, ILL.

General Air Filter Unit. Size only 20" x 20". Rated capacity 800 cu. ft. per mm. Average resistance ¼" water gage.



First Stage Continuous overlapping, slotted baffles, with oil reservoirs.

Second Stage Dense expanded metal to catch the finest dust.

CLEANER AIR FOR VENTILATION

You can get it thru the NEW two-stage

General Air Filter

The higher efficiency is due to the graduated removal of the dust by a system of continuous and overlapping baffles with slotted surfaces, that are kept continuously moist by self-contained oil reservoirs in the first stage and by dense oil coated metal surfaces of special construction, in the second stage.

The first stage catches all the coarse dust and lint particles. The second stage catches the remaining very fine dust.

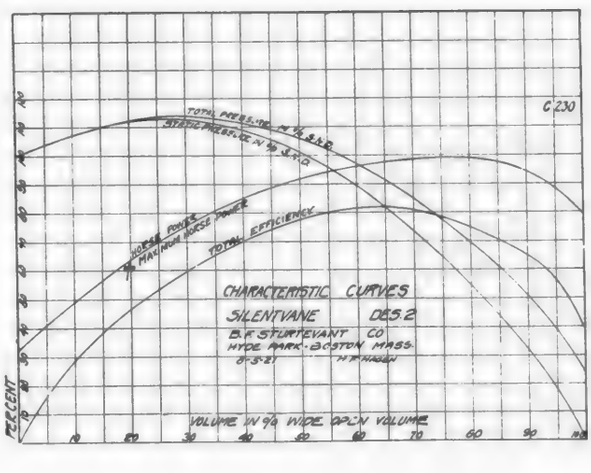
It is evident from the design and proved that this filter can contain a large accumulation of dirt without an appreciable increase in resistance.

Write us for Bulletin

General Air Filters Corp.
MANUFACTURERS
Air Purification Equipment
110 WEST 42ND STREET NEW YORK CITY

Sturtevant Silentvanes

are the ideal fans for ventilating



WHY are over a thousand Silentvanes successfully ventilating many of the country's most prominent buildings such as The Roosevelt Hotel, New York; Union Trust Co. Building, Cleveland; Edgewater Beach Hotel, Chicago; First National Bank Building, Boston, and Olympic Hotel, Seattle?

The curves opposite show the answer. High efficiency—hence low power. Silentvanes cut fan operating costs 25% to 30%. Silentvanes do not fall down if working conditions are not exactly as estimated. No worry about overloaded motors—self-limiting horse power characteristic prevents overload and permits use of motors considerably smaller than would be required for other types of fans.

What Silentvanes are doing for others is a good indication of what they can do for you. Specify Silentvanes and save power!

Send for our Silentvane Catalog 290

B. F. Sturtevant Company

Hyde Park, Boston, Massachusetts

Sales Engineering Offices

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Plants located at

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PUTS AIR TO WORK

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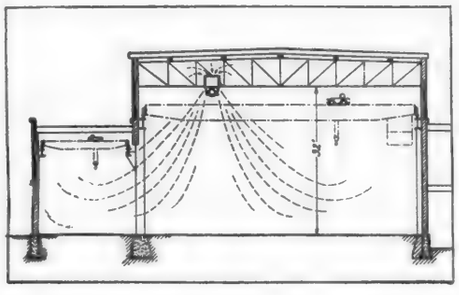
1554

WING

Featherweight

UNIT HEATERS



OVERHEAD INSTALLATION

2 REASONS WHY!

BOTH *SIMPLE* AND *POWERFUL*
BOTH PAY DIVIDENDS

A Considerable economy, in the amount of heat necessary to maintain a given temperature, is obtained by overhead installation. The heat loss through the roof, from overheated air normally accumulating there, is reduced by the prevention of this accumulation.

B With a view to securing maximum production from the available floor space, the overhead location offers a floor unhampered by heating equipment.

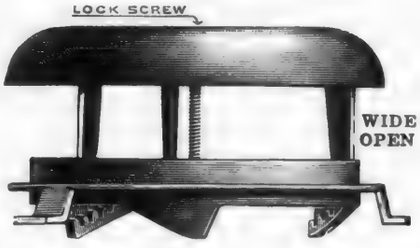
L.J.Wing Mfg.Co.

Fans and Exhausters — *Forced Draft Blowers*
Small Turbines — *Damper Regulators*
Hudson & 13th St. — **New York City**

Why the

Nu-Notch Mushroom?

REG. U.S. PAT. OFF.



Architects and Engineers prefer to specify KNOWLES NU-NOTCH MUSHROOMS, without alternate because

The Article Is Right

and has an established selling price, that will not be raised because of their confidence in it.

But while there may be only one kind of mushroom for them there are two kinds sold, Knowles and the others.

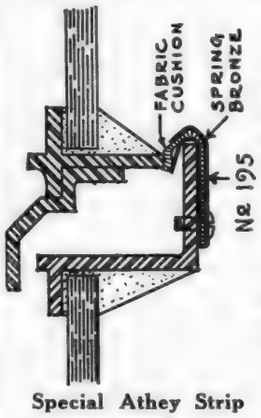
Sometimes the others get mixed in with orders for Knowles unless you look for the trade mark Nu-Notch which is cast on each floor piece.

Let us send full details.

Knowles Mushroom Ventilator Co.
202 Franklin St., New York

Athey *Cloth-lined metal* Weather Strip

A metal-to-cloth contact is the only method yet devised which makes a weatherstrip air and dust tight without making the windows hard to open and close. The ATHEY (patented) is the ***only cloth-lined metal weatherstrip made.***



Special Athey Strip for Steel Sash

The metal channel and rail are of imperishable zinc—they will not rust. The cloth used is guaranteed by us to be rot-proof, damp-proof, and moth-proof. Water or ice will not affect it. It won't pull out.

For Wood or Metal Sash

Specified by leading architects; used in finest buildings all over the country.

Write for complete information

Athey Company

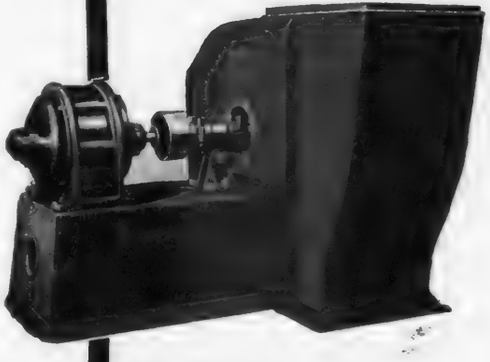
6057 W. 65th Street - Chicago, Ill.

"Buffalo"-Carrier equipment for every heating and ventilating requirement:

The Buffalo-Carrier line of heating and ventilating equipment is so complete that we can supply practically any apparatus you may need.

For the finest type of structure,—hotel, school, public building, theatre, department store, office and factory, the Buffalo-Carrier method of ventilating with washed and tempered air, is sure to produce the most satisfactory results at the lowest last-cost due to its low maintenance costs.

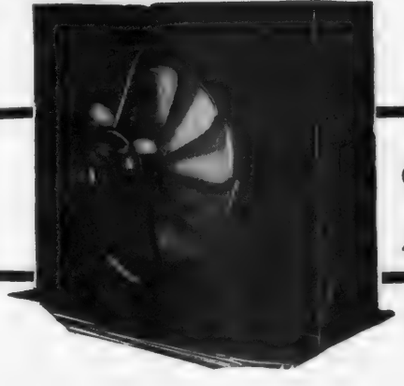
For general ventilating work the Buffalo Niagara Conoidal fan will be found very suitable. For heating factories, warehouses, garages and other buildings of like nature, Buffalo Unit heaters are widely used. The Breezo-Fin Heater shown here is light and strong, having an enormous capacity, and sells at a very low price.

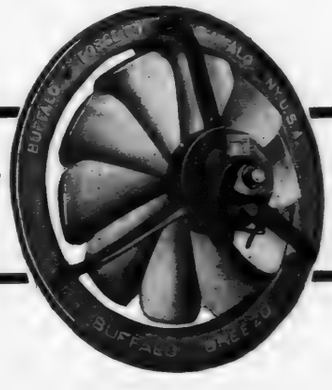


The Buffalo Breezo Propeller Fan is a highly efficient ventilating unit for blowing or exhausting air fumes, smoke, etc., against low pressure. Extensively used for ventilating where air conditions are bad.

Why not buy all your heating and ventilating equipment from "Ventilation Headquarters"?

We'll be glad to send catalogs on request.

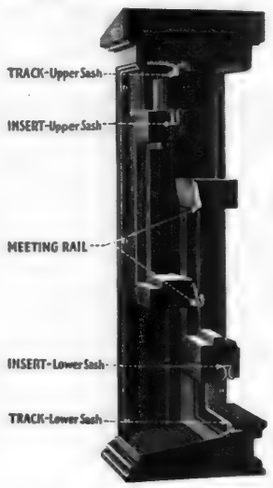




Buffalo Forge Company
Carrier Air Conditioning Company of America
480 Broadway BUFFALO, N. Y.

In Canada: Canadian Blower & Forge Company, Ltd.
Kitchner, Ont.

HIGGIN
ALL METAL
WEATHER STRIPS



The patent *Insert* strip makes Higgin Weatherstrips extra draft-tight

Higgin Weatherstrips are the only all-metal strips with the self-holding spring flange **Insert** in the sash. This **Insert** is important.

It makes a perfectly draft-tight contact at every point. Swelling or warping cannot prevent accurate fit and closure.

Without the Higgin Metal Insert the wooden groove will wear, swell or shrink, causing sticking or allowing seepage of air through the apertures.

Higgin Strips are "Metal against metal all the way round." Higgin-equipped windows and doors always keep cold air out and warm air in, operate smoothly and easily, and never need refitting.

HEATING ENGINEERS! You can safely guarantee a definite heating efficiency for your equipment when Higgin All-Metal Weatherstrips are installed. They keep all the cold air out and all the warm air in. They never lose their close fit by warping or shrinkage of frames. Every job is installed by trained Higgin men and guaranteed by the Higgin organization. Recommend Higgin All-Metal Weatherstrips to your customers.

The **HIGGIN** *Mfg. Co.*
Newport, Ky.
Toronto, Canada.

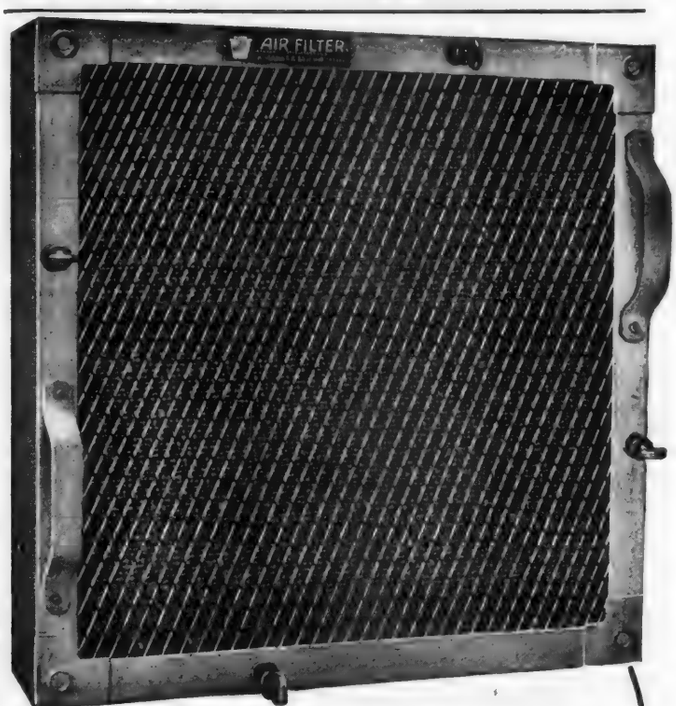
Manufacturers of Higgin All-Metal Weatherstrips and Higgin All-Metal Screens

DE BOTHEZAT
Disc Pressure Fans

Any Size — Pressure — or Volume

HIGH STATIC PRESSURE
HIGH EFFICIENCY

De Bothezat Impeller Co., Inc.
1922 Park Avenue, NEW YORK CITY



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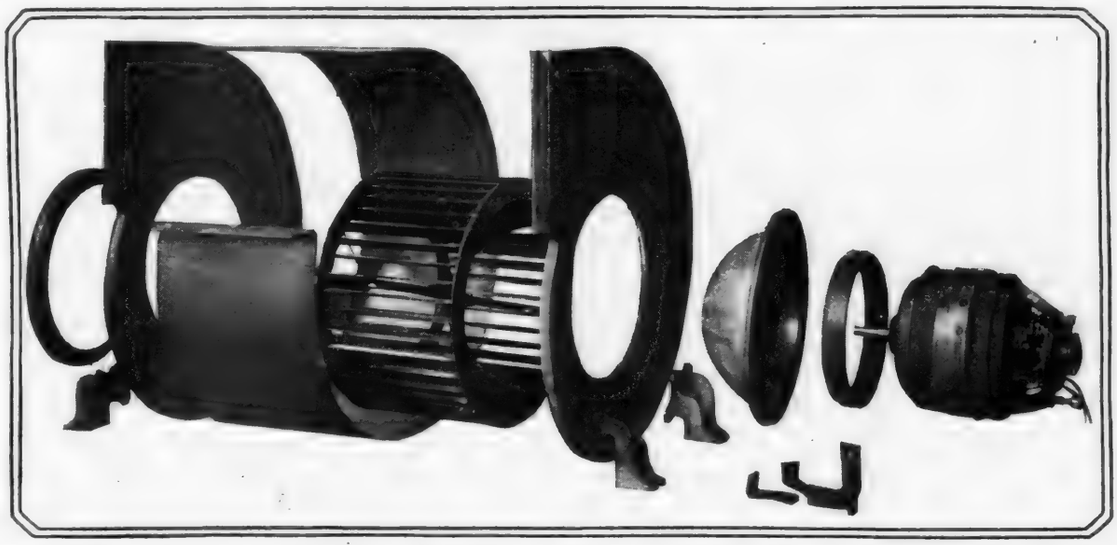
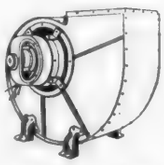
ALL METAL AIR FILTER CO.
3151 Shields Ave., Chicago, Ill.

ILG Blowers Are Made, Tested, Sold *and* Guaranteed *as a* Complete Unit



Illustrating the Simplicity *of Assembly of*-

Direct Connected Blowers



All ILG Blowers are tested at the factory on actual current and voltage of the circuit on which they will be used — the guarantee covers the complete unit.

GOOD Engineering has made ILG Direct Connected Blowers a notable example of compactness, combining excessive strength with minimum weight. The unusual simplicity of assembly makes for quiet operation, low power consumption and economical upkeep.

The motor is a built-in feature of ILG Direct Connected Blowers—it is made an integral part of the housing. No foundation is required for motor or blower — simply fasten the four legs to floor or ceiling.

Almost any problem of exhausting or supplying air in volume can best be solved with ILG Direct Connected Blowers. Made in sizes ranging from 25 to 90 inches.

A new bulletin of special interest to Architects, Engineers and Contractors is now ready — send for it.

ILG Belted Blowers are made with inter-changeable bowls and inlet flange. Pulley and wheel are overhung on shaft supported in two bearings in cast iron bracket.

ILG ELECTRIC VENTILATING CO., 2858 N. Crawford Ave., CHICAGO, ILL.

HIGH EFFICIENCY TRADE ILG MARK VENTILATING MACHINERY

Ventilation

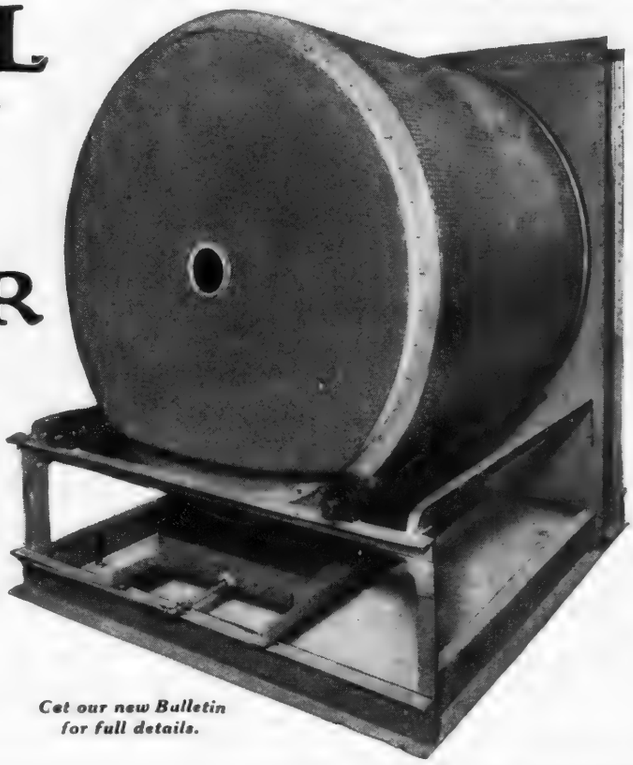
for Stores, Offices Factories, Public Buildings Restaurants, Theatres, Homes, etc.

The NATIONAL ROTARY Automatic AIR FILTER

A Filter that—

Its Four Distinctive Features:

1. High Cleaning Efficiency. — Made possible by a dense filtering medium. Never allowed to clog up with dirt.
2. Uniform Performance—the continuous washing process keeps the resistance and capacity constant.
3. Simple Mechanism—A lot more industrious and reliable than a man.
4. Minimum Upkeep—the lowest maintenance cost ever reached in air cleaning.



Cleans the Air and then Cleans Itself

NATIONAL AIR FILTER CO.
9 South Clinton Street
Chicago, Illinois

Get our new Bulletin for full details.

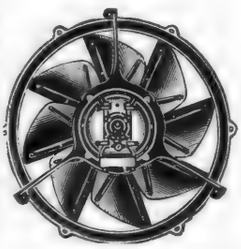
JAMES M. SEYMOUR

Established 1888

Lawrence St., Mechanic St. and Kirk Place, NEWARK, NEW JERSEY

AUDITORIUM FANS, 36" to 120" to fit any square opening. SEYMOUR FANS sold subject to substantial discount. Furnished with suitable pulley or coupling for direct connection TWIN FANS include shafting and center bearing.

Special Fans for Cooling Towers, Heating Systems, Induced Draft, Forced Draft, Dry Rooms, Dry Kilns.



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E-Z DAMPER
FIXED TOP

MUSHROOMS

CAST IRON

Intended for DeLuxe Theaters where expense is a secondary consideration.

Looks the Same—Much Simpler to Install

ÆOLUS DICKINSON CO.
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SEE OUR DETAILED DATA IN ASH&VE. GUIDE

MANUFACTURED WEATHER
makes
"Every day a *good* day"
Humidification · Dehumidification
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2000 Cubic Feet of Heated Air per Minute

—*wherever you want it!*

SIMPLY loosen the top and bottom union connections of the Modine Unit Heater, turn the heater in the direction where heat is most needed, tighten the unions—and you are all set for a constant delivery of 2000 cubic feet of heated air per minute, *right where you want it!* The union connections serve as swivels—there are no braces, brackets or permanent mountings required to hold the heater rigidly in any one, fixed position.

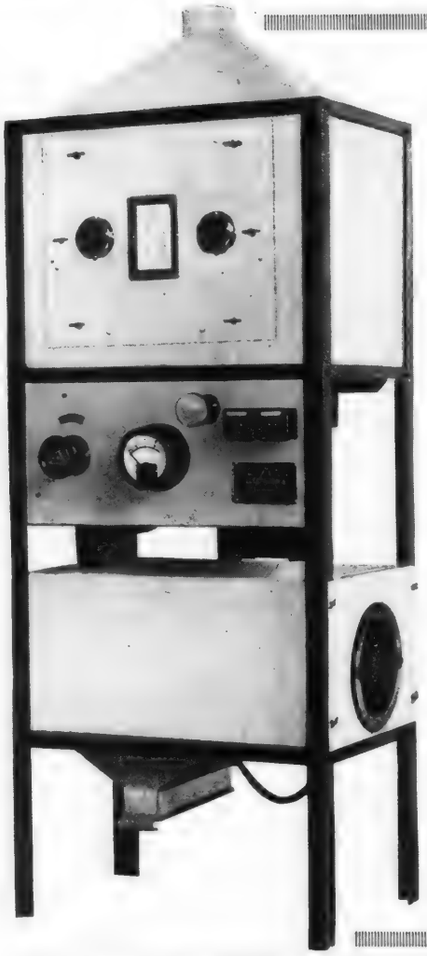
No other steam or hot water unit heater has this directional advantage, which is further supplemented by the adjustable deflector which throws the heat downward at any desired angle within 60 degrees. No other heater suspends from an overhead feed line. No other unit heater weighs so little (125 lbs.) and occupies such a small space (4½ cubic feet), permitting "drop suspension" installation. No other heater delivers so great a volume of heat per unit of weight (165,000 B. T. U. per hour at 60°).

Write for Bulletin "A" which describes this revolutionary industrial heating system in detail.

MODINE MANUFACTURING COMPANY
Heating Division ThermModine *Racine, Wisconsin*

The illustration shows how simple it is to DIRECT THE HEAT from the Modine Unit Heater WHERE NEEDED — toward a bad door or window, lathe, work benches, etc. One man with a wrench does it in a few minutes' time.

MODINE
UNIT HEATER
FOR STEAM OR HOT WATER HEATING SYSTEM



ELECTROZONE OZONATORS

The first successful ventilating ozonator and today, after many years experience and 300 large installations, it is the simplest and the most rugged ozonator available.

The Air Conditioning and Engineering Co.

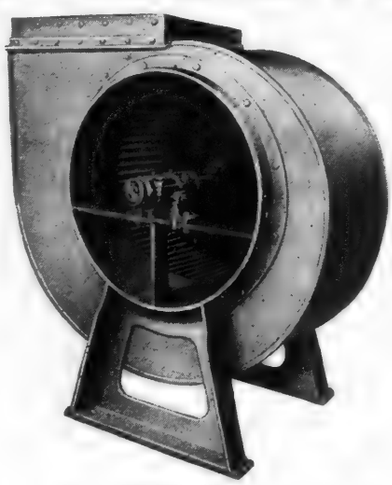
Main Office and Factory

2918 SOUTH JEFFERSON AVENUE

SAINT LOUIS, MO.

ELECTROZONE Ventilating Ozonators
ELECTROZONE Furnace Ozonators
ELECTROZONE Portable Ozonators
ELECTROZONE Water Sterilizers

Type M. E. Fan
The Certified Fan



Used in the better buildings where price competition ceases to be a menace. Write for Catalog No. 100, which reveals the reasons for the quietly operating, highly efficient fan with the remarkable characteristic curve.

The New York Blower Co.
2246 South Halsted St. Chicago, Illinois

How To Improve On Heating and Ventilating Systems

Bristol's Recording Thermometers placed at various points throughout your buildings provide the best possible check on heating and ventilating systems.

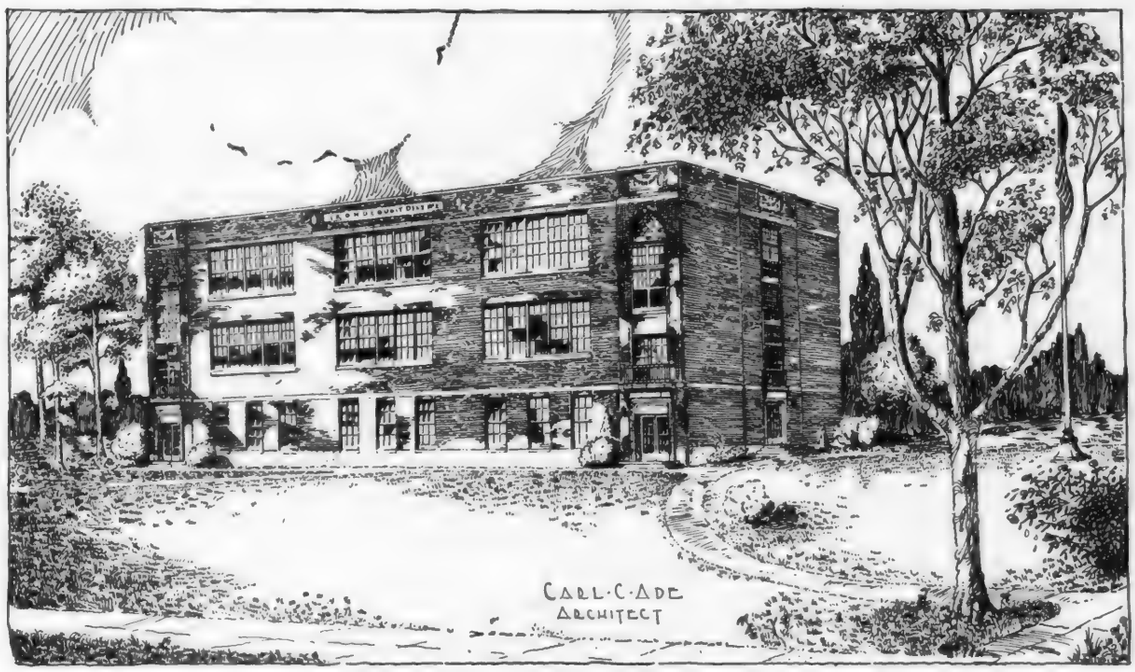
Let a Bristol's Chart Record show you where you can improve existing conditions.

Bristol's Recording Thermometers are furnished for all ranges of temperature from −60° to +1000°F. and in models to suit individual requirements. They are rugged in construction and require very little attention.

Write for Bulletins

The Bristol Company *Waterbury, Connecticut*

FOR 36 YEARS — MAKERS OF — BRISTOL'S RECORDING INSTRUMENTS



DISTRICT NO. 2 SCHOOL—IRONDEQUOIT, N. Y.

Architect, Carl C. Ade, Rochester, N. Y.
Heating Contractor, Arnsmeyer-Warnock-Zahrndt, Inc., Rochester, N. Y.

This New School Building is Now Being Equipped with Buckeye Heatovents

ARCHITECTS and builders everywhere are enthusiastic about the appearance of the Buckeye Heatovent.

It is finished with the same care and workmanship as any fine piece of furniture or expensive automobile. The Buckeye Heatovent, unit system of heating and ventilating, is made in any finish and will harmonize with the interior of your particular building.

Upon request we will send you an illustrated booklet giving full information about the Buckeye Heatovent.

Buckeye Heatovents incorporate the latest and best engineering principles and are constructed of the very highest class materials and workmanship. These features, together with that intangible asset "Buckeye Service" insure your clients against poor ventilation and future repair bills.

Full description and detailed drawings are to be had in our data book for architects and engineers, available on request. But our complete service includes, also, that of co-operation on the part of members of our engineering staff, who will consult with you on your heating problems.

Our new catalog is now ready. Write for your copy now.
Any of our Branches can supply you.

THE BUCKEYE BLOWER CO.

COLUMBUS, OHIO

BRANCH OFFICES:

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709 Columbia Bank Building, Pittsburgh, Pa.
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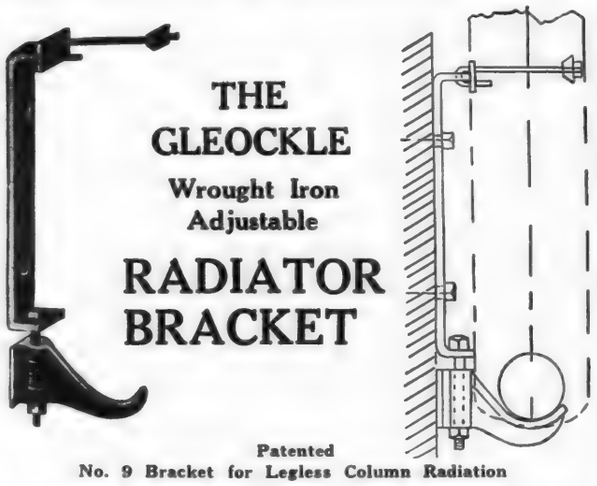
SPRACO
AIR FILTERS

Embody the highest standard of construction throughout. Installation cost is exceedingly low due to sectional framework. All parts made of heavy gauge metal assuring maximum life commensurate with reasonable first cost. The four quick acting spring latches which exert a total pull of 80 lbs. on the cell hold it tightly against the two point seal, eliminating any possibility of air leakage between framework and cells.

For further details send for Bulletin F-81

SPRAY ENGINEERING COMPANY
Boston, Mass.



THE GLEOCKLE
Wrought Iron Adjustable
RADIATOR BRACKET

Patented
No. 9 Bracket for Legless Column Radiation

Convenient—Safe—Durable

Used in buildings where the best equipment is specified, and besides being convenient, safe and durable they are easily erected, adjustable, inexpensive, sanitary, and invisible after erection.

FIT ANY MAKE OF WALL RADIATOR

Send for descriptive booklet and trade discount

A. F. GLEOCKLE, Jr.
415 Bay Street **Rochester, N. Y.**

Vapor Heating

assurance doubly sure when tied to the boiler with a

Wiley Safety Vent Vapor Regulator

Write for your copy of booklet describing the Wiley line of vapor heating specialties.

peerless quality product manufactured and sold exclusively by

The Simplex Heating Specialty Co.
(INC.)
Lynchburg, - Va.

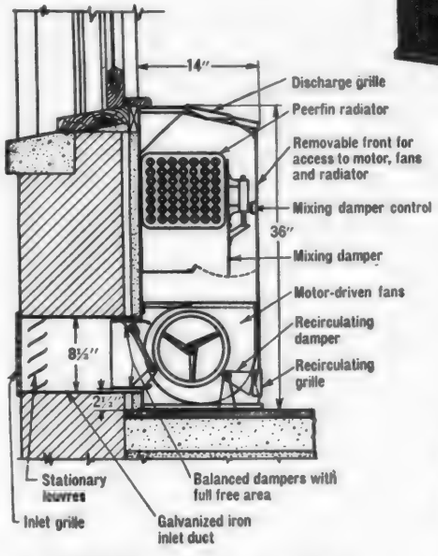
PEERVENT

Unit System Heating and Ventilation

In addition to the PeerVent heating-ventilating unit described on this page, we are prepared to furnish heating units especially adapted to use in factories, mills, garages, and other industrial buildings. If you are planning a building of that type, be sure to send for literature on Peerless INDUSTRIAL Heating Units. They cost less to install and are far more satisfactory than ordinary steam radiation.

ABOVE.— McGregor Library, Highland Park, Mich., equipped throughout with PeerVent Units. Architects: Tilton & Githens, New York; Burrowes & Eurich, Detroit. Heating-Ventilating Contractors: Legett-Doll-Forster Co., Detroit.

LEFT.—Standard type PeerVent Unit, 36 inches high, 14 inches deep. Concealed types also can be furnished, with many special adaptations for various architectural requirements.



Not Only for Schools

but also for Libraries, Hospitals, Churches, Club Rooms, Dormitories, Theaters, Banks, Offices, Auditoriums, and Other Buildings.

The PeerVent Unit System of Heating and Ventilating is perhaps best known among those who specialize on school buildings. This is natural because the requirements of school ventilation are commonly specified by law, and the PeerVent System meets all state codes; but PeerVent Units are equally suitable for any buildings where many people congregate.

If you are thinking of a building in which special ventilation would be desirable, please call upon us for any information which twelve years' experience with unit systems will enable us to furnish.

Bear in mind that the PeerVent System is perfectly flexible. You can place one PeerVent Unit in a single room, or you can equip the entire building with them. You can put them in old buildings almost as easily as in new ones. First cost and cost of operation are both substantially less than the cost of other systems of mechanical ventilation. The PeerVent System gives each room exactly the required cubic feet of air per minute, at any desired temperature, regardless of conditions in other rooms. No big apparatus room is needed, no bulky fans, ducts, flues, etc., nothing but the individual units, which take up little more space than ordinary radiators.

Send for the PeerVent Catalogue. Tell us what type of building you have in mind and we will refer you to PeerVent installations in such buildings. If you prefer to see our local sales representative, please wire collect.

PEERLESS UNIT VENTILATION COMPANY
INCORPORATED
Skillman Ave. and Hulst St.
Long Island City, N. Y.

CHICAGO
808 Monadnock Bldg.

BOSTON
100 Boylston St.

SPRINGFIELD, MASS.
196 Worthington St.

PITTSBURGH
339 Second Avenue

CLEVELAND
1836 Euclid Avenue

DETROIT
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DES MOINES
520 Securities Building

PORTLAND, ORE.
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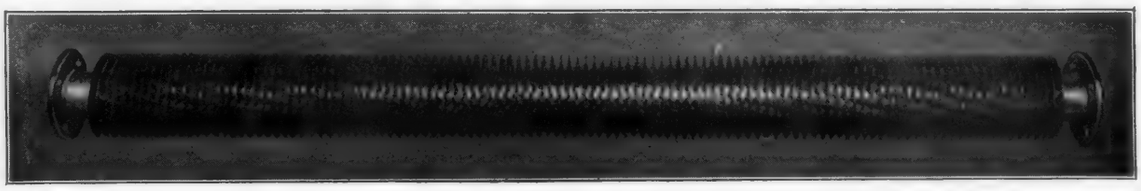
MINNEAPOLIS
240 7th Avenue South

TORONTO, CANADA
Darling Bros., Ltd.
77 York St.

Introducing



the

SCHUTTE KOERTING

RADIAFIN TUBES

for heating and cooling air and gases

The fins insure maximum heat transfer

Built in 1½", 2" and 3" sizes — all lengths — with or without flanges

Supplied with or without headers

SCHUTTE & KOERTING CO., 1153 Thompson St., Philadelphia, Pa.

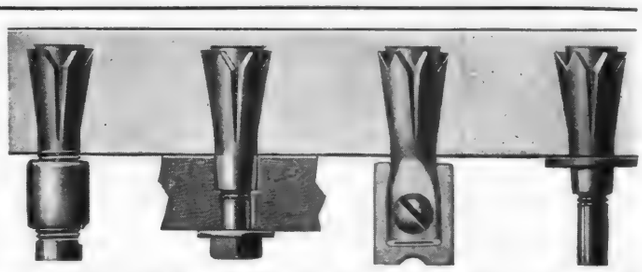
NEW PATENTED HARTMANN ADJUSTABLE RADIATOR BRACKETS

Dependable! Adjustable!
Economical! Accurate!

Write for Dimensions and Price List

CHARLES HARTMANN CO.

975-993 Dean Street BROOKLYN, N. Y.



Phillips Self-drilling Expansion Shells

For fastening all types of hangers to concrete ceilings, side-beams, columns and walls, and for bolting timbers and other equipment to concrete and stone.

Installing Self-drilling Shells in Concrete

Every shell is a drill and makes its own hole, thus eliminating drill trouble and expense.

A new sharp drill for every hole and a smaller hole per given size bolt reduces labor cost of installing to absolute minimum.

A perfect fitting hole and the enlargement of shell and hole at extreme bottom insures reliability and better workmanship.

Quickly installed with the Phillips Spring Hammer, or with special hand chucks.

Ceiling with Phillips Spring Hammer Drill

Manufactured by

PHILLIPS DRILL COMPANY

1537 Cortland Street CHICAGO, ILL.

Pecco Unit Heater Installation, Metropolis Bending Co., Metropolis, Ill. This plant is also equipped with 2 Pecco Blower Systems designed to pump 50,000 cu. ft. of air per minute out of the building.

Use Pecco Unit Heaters

Pecco Unit Heaters quickly establish and constantly maintain a uniform temperature at all points in all open building spaces.

Because:—

1st **The 2-way intake in a Pecco Unit Heater is located where it belongs—near the floor, at the cold air level.**

2nd **The warm-air outlets are located at points where warm air can be most efficiently projected —at or near the warm air level.**

Increased Heating Efficiency

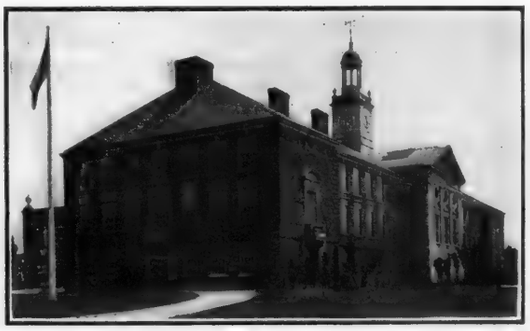
This design follows fundamental engineering principles and positively insures the most complete and thorough **re-circulation** of **all** air in the building. It results in high operating efficiency, principally because air circulation is **not** confined to an area immediately under the building roof.

In addition to floor type unit heaters, Pecco, Inc. also builds the so-called "copper fin" ceiling-suspension heater, which is recommended only where it is desirable to warm merely the air at and near the ceiling and where efficient over-all **re-circulation** is not essential.

PECCO, INCORPORATED, 2980 North Market Street, St. Louis, Mo.

PECCO UNIT HEATERS

"They Keep The Whole Place Warm"



South Side High School, Rockville Center, L. I., N. Y.
Huse Templeton Blanchard, Architect

SPENCER CLEANED—

Two representative installations of the Spencer System of Vacuum Cleaning are shown here; one in the East and one in the West.

There are many such installations in public schools and colleges the country over, and the wide acceptance and use of Spencer Systems in institutions of this type is the best evidence of their efficiency and dependability in solving the school cleaning problem.

Spencer performance has established a confidence in the Spencer System of Vacuum Cleaning by many leading engineers which has resulted in its acceptance as standard.

The recommendations of our Engineering Department may be obtained on any cleaning problem without cost or obligation.

Write for list of school installations and complete data regarding Spencer Equipment

SPENCER TURBINE CO.
HARTFORD, CONN.

SPENCER
CENTRAL CLEANING SYSTEMS

David Worth Dennis Jr. High School, Richmond, Ind.
Perkins, Fellows & Hamilton, Architects

GORTON PRODUCTS

Just off the Press.

Our New

84-page Catalog* and Heating Data Book on

"Gorton Heating Products"

is just off the press. We should like to reserve a copy of the first edition for your use. Early application will insure prompt receipt free of any cost.

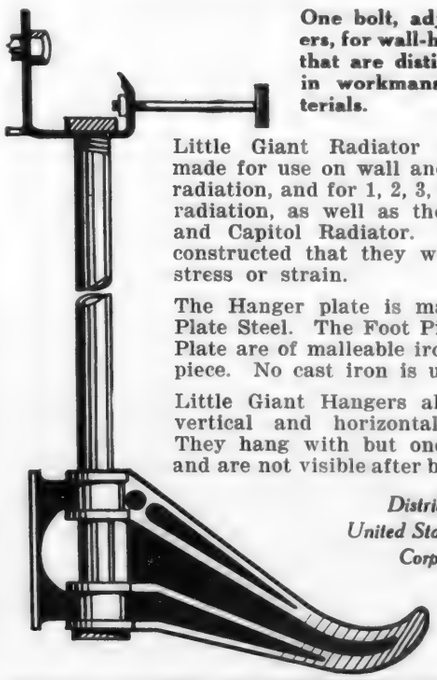
Contains original heating data of practical value for reference purposes.

**Tells all about the Gorton Single Pipe Vapor Heating System and Gorton Quarter Turn Packing Lock Radiator Valves.*

Address

Gorton & Lidgerwood Co.
Publicity Department
96 Liberty Street, New York, N. Y.
Established 1887

Little Giant Radiator Hangers



One bolt, adjustable hangers, for wall-hung radiation, that are distinctly superior in workmanship and materials.

Little Giant Radiator Hangers are made for use on wall and double wall radiation, and for 1, 2, 3, and 4 column radiation, as well as the Corto, Aero and Capitol Radiator. They are so constructed that they will stand any stress or strain.

The Hanger plate is made of Boiler Plate Steel. The Foot Piece and Back Plate are of malleable iron cast in one piece. No cast iron is used.

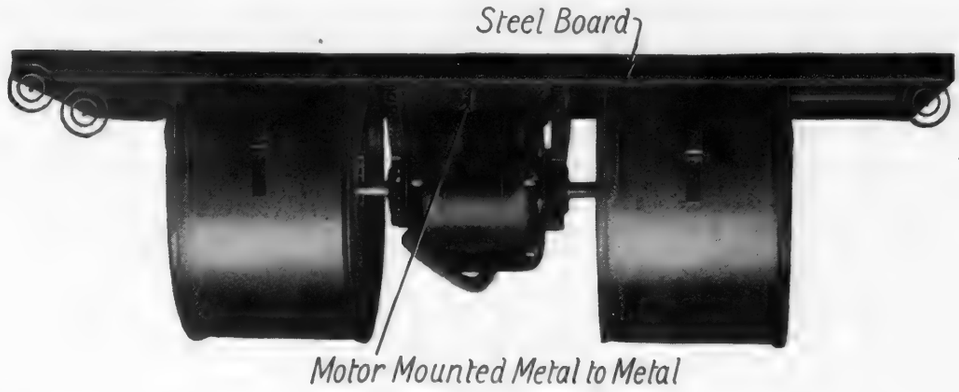
Little Giant Hangers allow for both vertical and horizontal adjustment. They hang with but one anchor bolt and are not visible after being installed.

Distributed by United States Radiator Corporation

Sold by all Leading Jobbers

Little Giant Mfg. Company
1927-31 Nicollet Ave., Minneapolis, Minn.

Universal Heating & Ventilating Unit



Quiet-Operating Single-Phase Alternating Current Motors Are Now Available in the *Universal Heating & Ventilating Unit*

As a result of the development of a quiet-operating single-phase motor in combination with the three-point lead mounting feature of the *Universal* Heating and Ventilating Unit we can now supply quiet-operating motors wound for any character of current. The use of a motor-generator set is no longer necessary.

This big step forward is fully described in our new publication No. 207, which will be furnished direct or through the nearest American Blower office.

John J. Nesbitt, Inc.

213 N. Vermont Ave.
ATLANTIC CITY, NEW JERSEY

405 Lexington Ave.
New York City

A Change in Name but NOT in Products

All the products of the American Schaeffer & Budenberg Corporation have been re-christened. In future the good old name "American" will appear on everything manufactured by us, which includes:

Indicating Thermometers	Water Relief Valves
Recording Thermometers	Engine Indicators
Indicating Gauges	Engine Room Clocks
Recording Gauges	Steam Whistles
Draft Gauges	Hydraulagraphs
"U" Gauges	Steam Traps
Gauge Testers	Tachometers
Oil Level Gauges	Revolution Counters
Temperature and Pressure Controllers	Calorimeters
Pop Safety Valves	Barometers
	Gauge Boards

Nearly four years ago, when the American Steam Gauge & Valve Mfg. Co., the Schaeffer & Budenberg Mfg. Co. and the Hohmann-Nelson Co. consolidated, we inherited so many different names on the various products of these firms that it was confusing to our customers. Hence the decision to call *all* our products "American," the trade name used for 75 years by American Steam Gauge & Valve Mfg. Co.

But this will not mean any change in the products. You are still assured of the same high grade materials, conscientious workmanship and the numerous refinements of design that have gained for these products such an enviable reputation during the past three-quarters of a century. The name "American" on such products as above enumerated will always be a name you can *trust*.

Our big Catalog N-14 illustrates and describes our complete line. Send for a copy.

AMERICAN SCHAEFFER & BUDENBERG CORP.

BROOKLYN, N. Y.

Atlanta	Cleveland	Philadelphia	*Seattle
*Boston	Detroit	*Pittsburgh	St. Louis
Buffalo	*Los Angeles	Salt Lake City	Tulsa
*Chicago			

*Stock carried at these branches.

Direct Factory Representatives for Eastern Canada:
Mechanical Equipment Co., 807 New Birks Building, Montreal
For Middle Western Canada: Kipp-Kelly, Ltd., 68 Higgins Ave., Winnipeg.

EFFICIENCY! ECONOMY! ENDURANCE!

THE FRANK

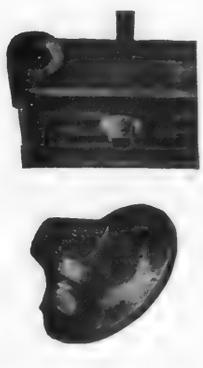
Line of Radiator Brackets

These brackets, the result of the ingenuity of John C. Frank, a steamfitter of years experience, were designed with a view toward greater efficiency, combined with simplicity; cutting down of cost without lowering the quality. Efficiency, endurance, economy.

Frank Radiator Legless Brackets require only one bolt. This means a saving of from $0.12 up on each bracket plus cost of drilling and inserting extra bolts.

The brackets are neatly concealed, and easily adjusted—horizontally or vertically.

Full line invented by Mr. Frank is described fully in our pocket-sized catalog. Send for one today.



The Frank Radiator Bracket Co.

30 No. LaSalle St. Chicago, Ill.

Over Four Million cubic feet per minute of Clean Air is now being supplied thru Phoenix Constant-Effect Filters

To the Air Cleaning Principle of the Viscous Coated Surface

PHOENIX ADDS

the exclusive advantages of

AUTOMATIC CONSTANT-EFFECT

which means

Constant Cleaning Effectiveness Constant Resistance
Constant Air Volume Delivered

Either motor or manually operated, the Phoenix screen is moved approximately three feet once each day, being thereby automatically cleaned and kept at maximum effectiveness. Sediment removal, from the lower oil reservoir, is required but *3 or 4 times per year!* The maintenance and operation expense of the Phoenix Constant-Effect Air Filter is therefore less than for any other Air Filter available.

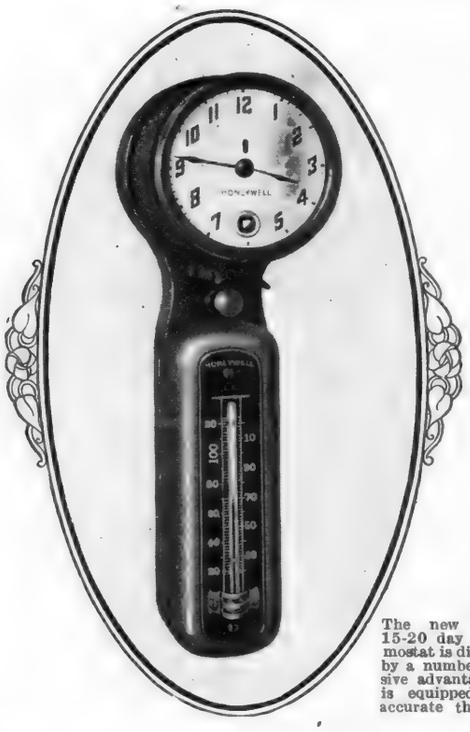
Constant-Effect - Lowest Operating Cost

Can you afford to use or recommend any other Air Filter?
Descriptive and Data Bulletin upon request.

DRYING SYSTEMS, INC.

11 South Desplaines Street
(After May 1st, 1926—1800 West Foster Ave.)
CHICAGO, ILLINOIS

Offices in all Principal Cities



The new Honeywell 15-20 day clock thermostat is distinguished by a number of exclusive advantages. Each is equipped with an accurate thermometer.

Your Customers are Ready

for

HONEYWELL

Temperature Regulators

There is now a genuine demand—a huge new market—for automatic room temperature controls.

Tens of thousands of householders are ready to enjoy the greater comfort and convenience of automatic regulation. They realize that hand regulation is an outworn practice, regardless of the kind of heater used or the kind of fuel burned.

To protect the mutual interests of his customers and himself the heating contractor must recommend the control that assures the most dependable service.

Hundreds are taking a leaf from the book of the heating plant manufacturer and the oil burner maker and are identifying themselves with Honeywell.

For completeness of accurate service, for simplicity, for dependable, unfailing action there is nothing in this field to equal Honeywell Automatic Temperature Controls.

THE HONEYWELL HEATING SPECIALTIES CO.
WABASH, IND.

SELLING MORE AND BETTER BOILERS

When you have sold and installed a THATCHER you have paved the way to additional business and bigger profits for yourself—for THATCHER performance is 100% under all conditions.

A THATCHER gives maximum heat with little coal. Easy firing on coldest days—no forcing, no burning out of grates, just steady satisfaction at all times—that will build trade for you.

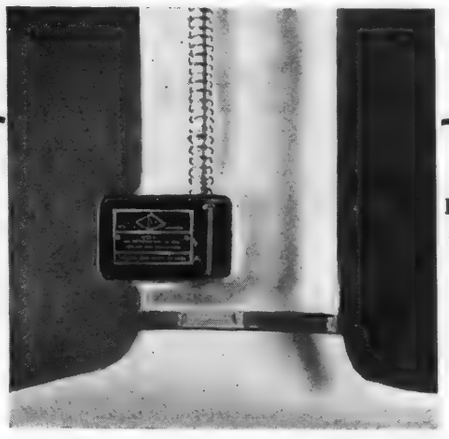
It will pay you to know Thatcher. Our catalog tells you the story.

Write for it today.

THE THATCHER COMPANY
Formerly Thatcher Furnace Co.
Since 1850
21 West 44th Street NEW YORK 39-41 St. Francis St. NEWARK, N. J. 341 N. Clark Street CHICAGO

THATCHER

BOILERS-FURNACES-RANGES



D. & D. Safety Boiler Control on Flow Pipe

Simplicity

The **D. & D.** Safety Boiler Control is a simple device, very easily installed, and is designed to **stop the oil burner when the boiler is overheated.** This control may be used in either steam or water boilers with equal effect.

Where **D. & D.** Safety Boiler Controls are used, there will be no more burned out boilers or fissured sections due to an inadequate supply of water.

Catalogue upon request.

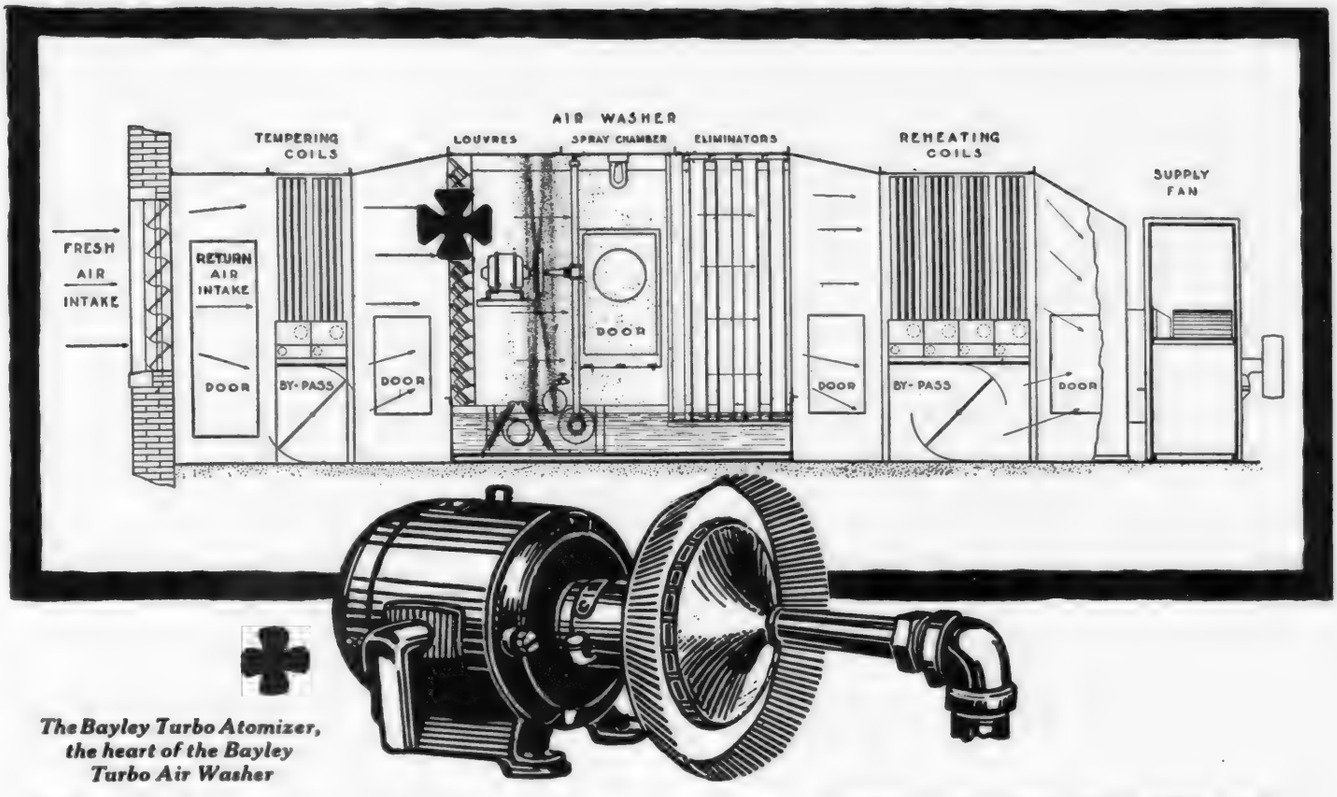
Manufactured by

DAVIS & DAGGETT CO.

238 Dwight St. ∴ Springfield, Mass.

Highest Endorsements of Oil Burner Manufacturers.

The Bayley Turbo Air Washer Saves 40 to 60% Power Requirement



The Bayley Turbo Atomizer, the heart of the Bayley Turbo Air Washer

THE Bayley Turbo Air Washer operates at a water pressure of only 1¾ lbs. per square inch at the nozzle. Contrast this with the 10 to 30 lbs. per square inch water pressure needed on fine orifice nozzle spray banks; it means that the Bayley saves 40 to 60% of the power required to operate high pressure systems.

The remarkable operating economy of the Bayley Turbo Air Washer is possible because of the Turbo Atomizer—exclusive with Bayley. The Turbo Atomizer produces a uniform, dense spray through a combination of low pressure and centrifugal force. Water is delivered by a single fire type nozzle to the center of a rapidly revolving rotor or spray wheel where it is churned centrifugally into a solid mist screen. The Turbo Atomizer entirely replaces the bank of fine nozzles necessary in most washers. It requires only from 75 to 90% of the pressure required by the fine orifice nozzles and therefore saves from 40 to 60% of the power requirement.

Hartman Furniture Bldg., Chicago, Ill. A. S. Alschuler, Architect, Chicago; The Haines Co., Contractors, Chicago. A representative Bayley installation, consisting of Bayley Chinook Heaters, Bayley Plexiform Fans, and Bayley Turbo Air Washers.

Aside from its operating economy, the Bayley Turbo Air Washer has also the outstanding advantage of being non-clogging. The single, fire type nozzle (minimum diameter ¾") allows the passage of entrained solids without clogging. A single clogged nozzle in a multiple spray bank means a "hole" in the water screen, and several clogged nozzles so seriously interfere with the efficiency of the washer as to necessitate cleaning and reassembly, costly in time and money. Non-clogging and economical in operation—these are features that make the Bayley the most efficient air washer available today. Write for Bulletin No. 25 giving the complete facts.

BAYLEY MANUFACTURING CO., 742 Greenbush St., Milwaukee, Wis.

New York—Suite 503, 30 Church St. Buffalo, N. Y., 333 Jackson Bldg. Pittsburgh, Pa., Leiendecker Bros., Fulton Bldg., 2nd Floor. Cleveland, Ohio, 523 Penton Bldg. Detroit, Mich., Purcell Stone Co., 2847 Grand River Ave., Chicago, Ill., 1156 1st Nat'l Bank. St. Louis, Mo., 1928 Railway Exch. Bldg. Kansas City, Mo., Mutual Bldg. Des Moines, Iowa, 521 Hubbell Bldg. Salt Lake City, Utah, P. W. Belcher, Dooly Blk.

Bayley
AIR ENGINEERING & EQUIPMENT
HEATING AND VENTILATING
AIR WASHING AND HUMIDIFYING SYSTEMS
DUST EXHAUSTERS—PRESSURE BLOWERS
MECHANICAL DRAFT FANS
AIR AND GAS SCRUBBERS
INDUSTRIAL DRYING SYSTEMS

So Much Smoke—There Must Be Fire

Ask to see the gauge boards of any of the three great stations of the Detroit Edison Co., or the Kearney Station, Public Service Co., N. J., or the Toronto Station, Ohio Edison Co., or the Crawford Ave. Station, Commonwealth Edison Co., Chicago; or the Long Beach Station, California Edison Co., or the Edgar Station, Boston Edison Co.; or the Philo Station of the Ohio Power Co., illustrated above.

You'll find all of these plants and many more equipped with Foxboro indicating, recording and controlling instruments.

Here are the most efficient power producing plants in the world. The engineers in charge reduce the production of power to a science. Scientific control is made possible by information supplied by these instruments. You may be sure that this responsibility is not intrusted to instruments that are not accurate, dependable and reliable.

In the face of these facts there must be some justification for Foxboro's claim for superiority.

THE FOXBORO CO., Inc.

Neponset Avenue, Foxboro, Mass., U. S. A.

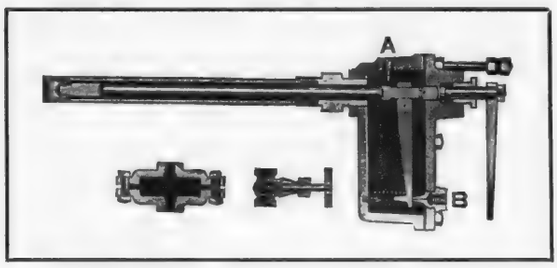
New York Chicago Boston Philadelphia Pittsburgh
Cleveland Rochester Tulsa Atlanta
Los Angeles San Francisco Portland, Ore.

FOXBORO

REG. U. S. PAT. OFF.

THE COMPASS OF INDUSTRY

Quality KIELEY REGISTERED TRADE MARK **Simplicity**



A Hot Water Temperature Controller that operates with one steam valve.

Hydraulic control regulates the steam supply to the heater and eliminates the extra reducing valve generally required where pressures exceed 25 pounds.

Send for Bulletin

KIELEY & MUELLER, Inc.

34 West 13th St. New York City

E-Z

RADIATOR HANGER

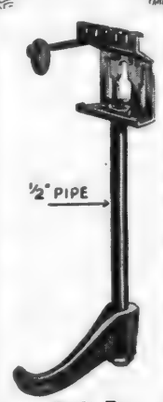
"A big help to customers"

Your customers will help you when they see what a vast improvement E-Z Radiator Hangers make! No more reaching and straining to clean beneath the radiators! No hot legs to melt the floor finish and cause dust spots! Nothing to interfere with broom or sweeper!

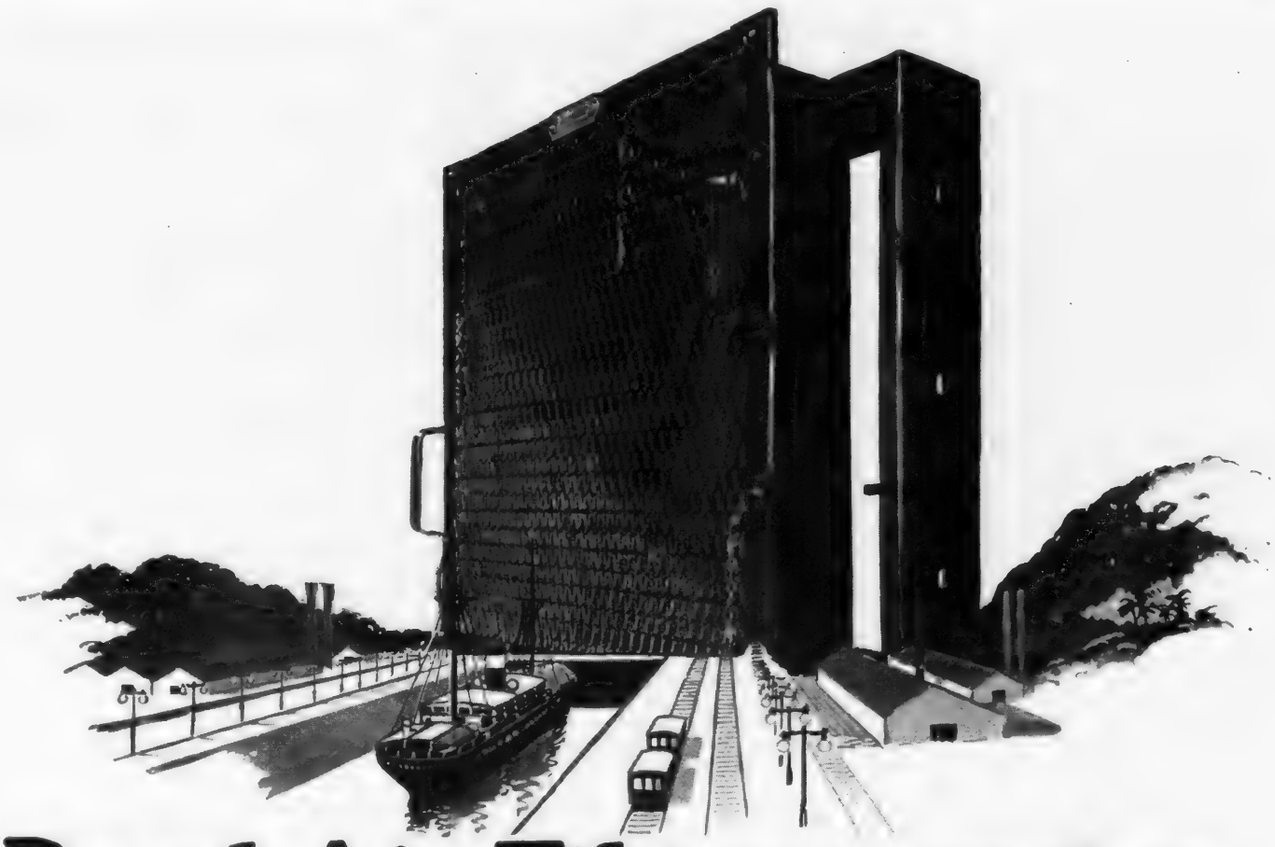
It pays to please the women. They are good advertisers!

HEALY-RUFF CO.

772 Hampden Avenue
ST. PAUL, MINN.



Style R



Reed Air Filters *used on the Panama Canal*

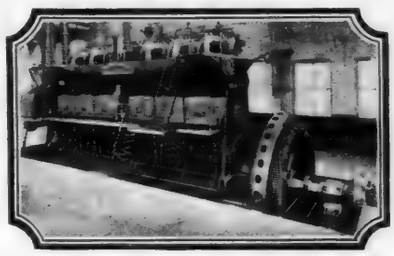
IN the new 12,000 HP Diesel power plant on the Panama Canal—the last reserve in case of shut-down in the hydro-electric plant—112 Reed Air Filter units have been installed to protect the three huge Nordberg Diesel engines against the damage of unclean air.

Government experts selected Reed Air Filters in the face of lower bids because of their proven standards of highest cleaning efficiency, lowest operating resistance and largest dust capacity.

In the world's greatest industries Reed Air Filters are the consistent choice of far-sighted buyers who appreciate the value of actual efficiency and ultimate economy—the logical standards by which air filters should be selected for your air-cleaning requirements, whatever they may be.

REED AIR FILTER COMPANY, *Incorporated*
215 Central Ave., Louisville, Ky. *Offices in Principal Cities*

Reed Air
TRADE MARK
filters ALL METAL

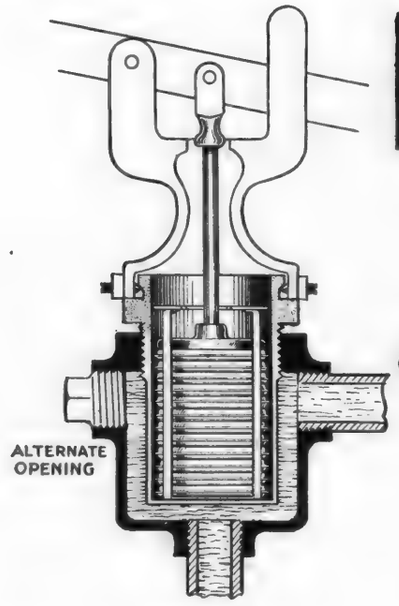


One of the Three 4000 HP Nordberg Diesel Engines on the Panama Canal

It is estimated that Reed Air Filters will increase the life of this valuable equipment from 25% to 50% and will pay for themselves by the saving in lubricating oil alone.

Send for the REED BLUE BOOK

—it tells how Reed Air Filters can save money for practically every industry in General Ventilation, Electrical Ventilation, Industrial Processes, Air Compressors, Oil and Gas Engines, Drying Operations, Bacteria Control, Recovery and Control of Dusts, etc.



A New Fitting!

THIS new special fitting—shown in black—simplifies the installation of the Type F Regulator.

Type F Damper Regulator is always required to properly complete a Hot Water installation just as a regulator is standard trimming on a steam boiler.

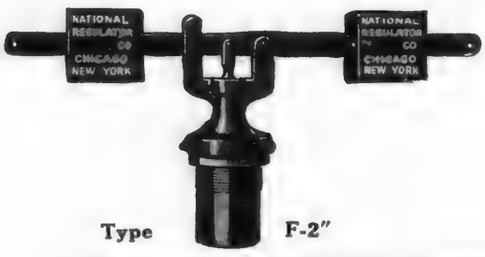
METAPHRAM DAMPER REGULATOR

A sensitive but powerful device that makes a Hot Water plant more efficient, more satisfactory—and more profitable.

Metaphram is the trade name of the metal diaphragms which form the sensitive element in our regulators. These Metaphrams are separable with "cage assembly" and may be lifted, as a unit, from the dry well in which they operate, should replacement be necessary. The well is placed in a 2-inch opening in boiler when available or installed in pipe line. The new special fitting simplifies installation in old work.

Specify Type F fitting when wanted.

Order Type F Regulator and Type F fitting from your jobber or direct. Circular on request.



Type F-2"

NATIONAL REGULATOR CO.
2301 KNOX AVENUE CHICAGO
European Office: A. J. Assheton, 18 St. Thomas St., London, S. E. 1, Eng.

Why Wait *for* Hot Water

When you can have it instantly with DAHLQUIST AQUATHERM COPPER RANGE BOILER

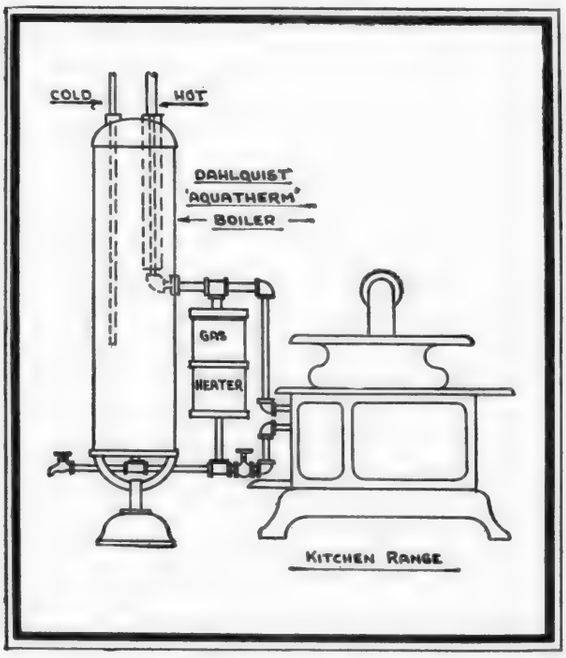
You can have both an instantaneous water heater and a storage system in one, at slightly more than the cost of a copper boiler alone.

The Dahlquist Aquatherm Copper Range Boiler eliminates waiting for hot water. Can be connected to water back in coal range or ordinary gas heater or any of the usual sources of heat. When hot water is not wanted immediately, the Aquatherm stores it in the range boiler. The action is entirely automatic.

The Dahlquist Aquatherm attachment can also be furnished and installed in any other range boiler now in use.

Let us send full details

DAHLQUIST MFG. CO.
40 W. 3rd St. BOSTON, MASS.

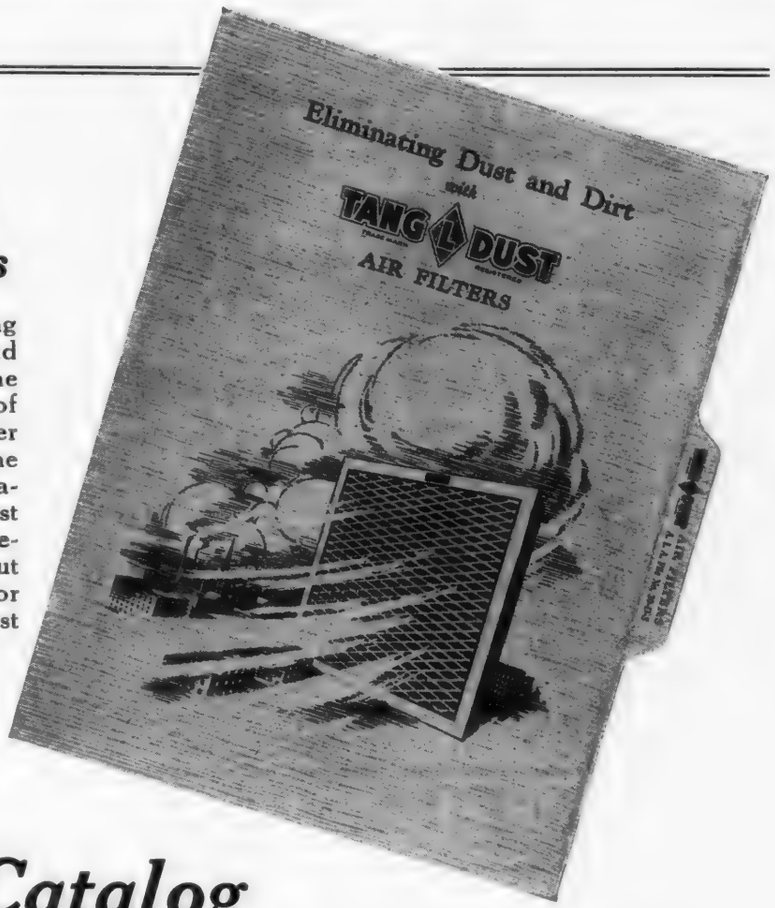


*Dahlquist Aquatherm Copper Range Boiler installed in connection with gas tank water heater and water back in coal or wood kitchen range (note the saving of pipe, fittings and labor).

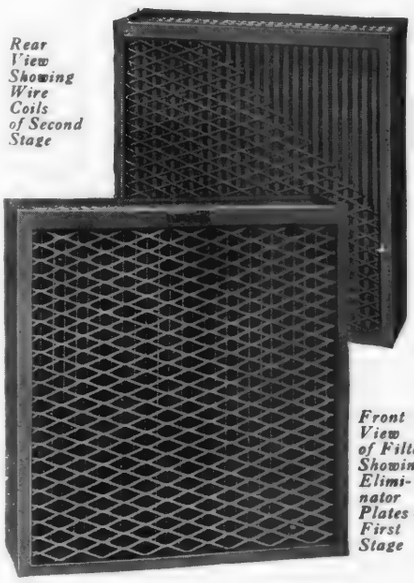
TANGLDUST
TRADE MARK REGISTERED

Heating and Ventilating Engineers and Contractors

Everyone interested in clean air for building ventilation and industrial plants should send for a copy of this new catalog, just off the press. It tells about an entirely new type of air filter constructed in two stages for greater efficiency and with a renewable oil pad at the top of each filter cell. Where the specifications call for the use of air filters, Tangldust Air Filters will meet the most rigid requirements of architects and engineers throughout the country. On your next job ask us for a quotation and the name of our nearest representative.



Send for New Catalog
On TANGLDUST Air Filters



Rear View Showing Wire Coils of Second Stage

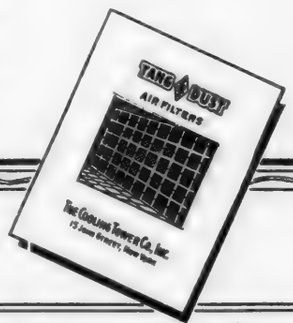
Front View of Filter Showing Eliminator Plates of First Stage

This catalog summarizes the outstanding features and advantages of Tangldust Air Filters over other and older types with which you may be familiar. The Tangldust Air Filter cell is not simply a frame filled with either mineral wool or expanded metal. It is a carefully designed piece of engineering apparatus, built to meet the requirements for correct air filtering equipment.

Low Resistance to the Air Flow

Constructing the Tangldust Air Filter in two stages provides for the elimination of 97% of the dust and dirt in the air, prevents the filter from building up a resistance to the air flow and allows it to be easily cleaned. An oil pad at the top of each filter cell is renewed with oil at each charging, giving additional life to the filter and preventing it from drying out between chargings.

These features cut upkeep costs considerably and save the replacement of filter cells later on. Tangldust Air Filters are adapted for all types of general and electrical ventilation, air compressors and internal combustion engines, drying operations, dust recovery and bacteria control. Write for your copy of Catalog H-5.



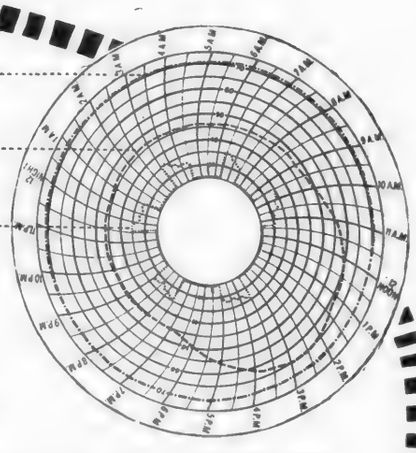
TANGLDUST
TRADE MARK REGISTERED
AIR FILTERS

MADE BY THE COOLING TOWER COMPANY, INC.- 15 JOHN STREET, NEW YORK

Hornung's "Master" ontrol Valve

CENTRAL STATION & INDUSTRIAL HEATING & LIGHTING JCH

Do You Heat "All Outdoors?"



It is safe to say that except in extremely cold weather at least as much heat from Central Stations is thrown out of windows as is used to warm interiors.

The only way to correct this condition is to control the volume of heat *supplied*, in direct proportion to the amount *needed*.

Hornung's Master Control Valve is doing this in hundreds of buildings. It automatically cuts off the heat supply when not needed—and this saving is immediately felt at the source, cutting down very perceptibly the waste of fuel.

The chart at the right is reproduced from one of many made by recording thermometers under average service conditions. Curve 1 shows temperature maintained in the building for 24 hour period. Curve 2 shows outside temperature at same time. Curve 3 shows how often the valve was opened and closed, and how long steam was on building—altogether 9 hours out of the 24.

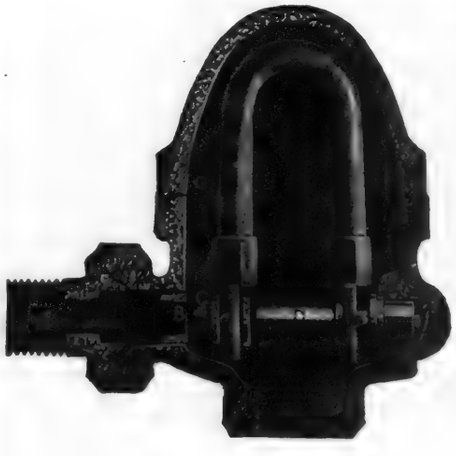
Which demonstrates that when outdoor temperature is above freezing, as it is by far the greater part of the heating season, steam is *needed* only a small percentage of the time, to maintain proper conditions inside.

Let us tell you how you can save heat through the "Master" Control Valve.

HEAT LOSS IS MONEY LOSS (3409)

CENTRAL HEAT APPLIANCES

343 S. Dearborn St. J. C. HORNUNG ENGINEER Chicago, Illinois.



The Perfect Automatic Valve for Vacuum or Vapor Heating

The "Vento" Automatic Valve represents a steady improvement in the Haines line of steam traps and offers the highest degree of steam trap efficiency.

There has been no change in the old reliable principle that has placed Haines Automatic Valve in a class by itself. The operating power is identical—the only difference being in the general construction.

Special features are: Horizontal mounting of valve mechanism—long range of movement—positive action—quick opening and closing.

"VENTO" Advantages

System starts with valve wide open, assuring circulation almost the instant steam is turned on.

Control of valve opening from two to eight times larger than other makes of valves.

Size of valve opening reduces danger of fouling with scale or other foreign matter.

Closes absolutely tight against steam. No necessity for use of spray water at pump.

Cannot stick or gum from foreign matter, and operation is absolutely noiseless.

Send for booklet

WILLIAM S. HAINES & CO.

12th & Buttonwood Streets

PHILADELPHIA, - - PA.

VENTO

The BEST Heating Plant *can't keep* Warm air IN a Building!

February 3rd, 1926

Chamberlin Metal Weather Strip Co.,
Detroit, Michigan.

Gentlemen:

I want to say that before your installation it was impossible to keep our building comfortable. I called on the manufacturer of our heating system to send a man to look after it, they sent me an expert from the factory, who said I was not firing the furnace properly. I told him to try it himself. He fired long enough to burn grate bars out of two furnaces without getting the thermometer to register in class rooms. Since your weather strip has been installed in our school I have had no trouble in keeping our rooms perfectly comfortable with less consumption of fuel.

Signed: H. D. Lewis.
Cheriton, Va.

Cheriton High School, Cheriton, Va. completely equipped with Chamberlin Metal Weatherstrips.

Here is interesting evidence on the efficiency of Chamberlin Metal Weather Strips from a building engineer. It is one of many similar letters we have received.

Oftentimes a building equipped with the very best heating plant is chilly and uncomfortable in winter. It doesn't seem to heat. When such is the case, the chances are that the warm air is leaking out and the cold air leaking in around doors and windows—a condition that can be entirely remedied with Chamberlin Metal Weather Strips.

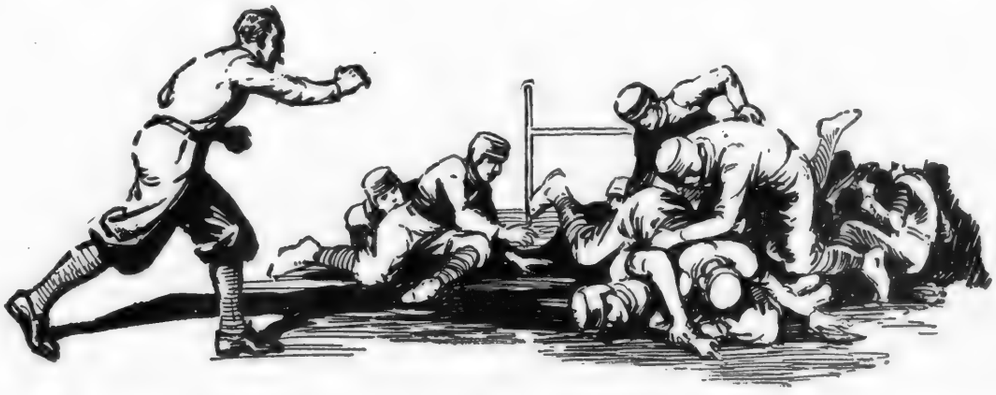
Therefore when a building doesn't heat properly look further than the heating plant—look to the matter of weatherstripping.

Tests show that an ordinary window 5 '2"x2' 8" will leak 24 cu. ft of cold air per minute when the wind is moving at the rate of 7½ miles per hour. When the wind is blowing 15 miles an hour such a window will leak 47 cu. ft. of air per minute. And that isn't all. In masonry walls uncalked cracks around window and door frames, with the above wind velocities prevailing, will leak an additional 2½ and 9 cu. ft. of air per minute.

Engineering tests on Chamberlin installations from 10 to 23 years old show that Chamberlin equipment and calking as installed by Chamberlin mechanics will prevent from 85 to 95% of all possible inleakage of air at windows and doors.

CHAMBERLIN METAL WEATHER STRIP COMPANY
West Lafayette Blvd., Detroit, Mich.
100 Sales and Service Branches throughout the United States

CHAMBERLIN
METAL WEATHER STRIPS
"SINCE 1893-THE STANDARD"



Following the rules of the game

Codes of business and professional ethics are not a happy accident. They evolved, the logical outcome of one man's consideration for another. The honorable act became the rule of the game.

A code of ethics as strict and binding as that of any business or profession has been adopted and is put in practice by the publication that carries this message and by the other member publications of the Associated Business Papers, Inc.

Among these "rules of the game" are six of particular interest to you the reader:

(1) To consider, first, the interest of the subscriber.

(2) To subscribe to and work for truth and honesty in all departments.

(3) To eliminate, insofar as possible, the publisher's personal opinions from his news columns. To be a leader of thought in his editorial columns, and to make his criticisms constructive.

(4) To refuse to publish "puffs", free reading notices, or paid "write-ups"; to keep his reading columns independent of advertising considerations; and to measure all news by this standard: "Is it real news?"

(5) To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.

(6) To determine what is the highest and largest function of the field which the publisher serves, and then to strive in every legitimate way to promote that function.

These pledges mean you can place full faith in the editorial content and in the advertisements in this publication.

Through the news columns you can keep your finger on the pulse of nation-wide activities in your line. In the advertisements you have a reliable market place of your field.

The firms publishing the advertisements have chosen this paper to reach the progressive men who are searching for ways and means to enhance the value of their service. Such advertising eliminates waste, and consequently reduces selling costs.

THE ASSOCIATED BUSINESS PAPERS, Inc.
Executive Offices: 220 West 42nd Street, New York, N.Y.

A.B.P.

An Association of none but qualified publications reaching 54 fields of trade and industry.

The Heating and Ventilating Magazine is a member of The A. B. P.

The Evidence of 3 Roofs
1. Snow remains on the Ashenhurst Insulexed house, Chicago, proving the absence of heat leakage through the roof. Photo taken 6 days after snowfall.
2. Snow has disappeared. The owner of this uninsulexed house wastes heat.
3. Snow still covers a detached unheated garage, due to entire absence of heat.
1
2
3

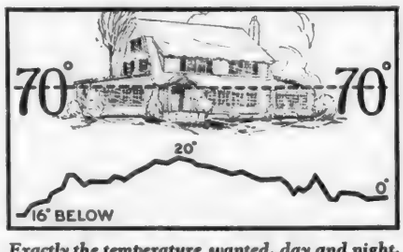
Stop heat leakage
—and save half the usual fuel cost

FOR the first time in history, it is now possible to maintain warm, even temperature in all parts of the house, without drafts, regardless of weather, with a small heating plant, and at half the usual fuel cost. Insulex, by stopping heat leakage through walls and roof, keeps the house warm, makes forced firing unnecessary, and saves its cost in yearly fuel bills.

Notice the roof of the second house in the photograph above, taken six days after snowfall. Snow has practically disappeared, due to heat escaping through the roof. In severe weather, the owner of such a home forces his fires, throws blasts of heat into the rooms, causes floor drafts, and dries out healthful humidity. He is fortunate if the house is warm a fraction of the day, let alone at night. The reason for failure to be comfortable is the tremendous outflow of heat through walls and roof. The heat he has generated at great expense is uncontrolled.

Insulex keeps heat inside

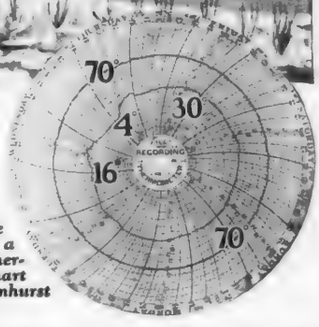
But notice the frame house in the foreground. House heat has had no more effect on the snow than the cold air in the detached unheated garage shown in the distance. This house is Insulexed, and was warm in zero weather last winter. The owner utilized only one-half his heating plant capacity, which in itself was half as large as engineers believed necessary.



Exactly the temperature wanted, day and night, regardless of weather, at half usual fuel cost.

Best insulation for the money

Tests by competent engineers show that 3⅝ inches of Insulex in the side walls, and 4 inches elsewhere, give 1½ to 7 times more effective insulation than other insulating materials; and cost considered, from 2 to 4 times as much for the money expended.



Remarkable proof from a recording thermometer chart in the Ashenhurst home.

Outer line shows constant 70° temperature downstairs, day and night, for the entire week ending Feb. 7. Inner line shows outside temperature varying from 16° to 4° to 30° above zero.

There is further initial saving in the smaller heating plant and less radiation required to keep the house warm.

Makes frame construction practically fireproof

Insulex will not burn. It seals with a fireproof barrier the spaces between studs, which in ordinary frame construction makes every wall a series of flues, carrying air currents from cellar to garret. Fire cannot spread from floor to floor, when walls and ceilings are Insulexed.

Ask our service experts

We welcome the most exhaustive investigation by heating engineers, and will gladly cooperate in preparing specifications. Write for technical and descriptive data.

UNIVERSAL GYPSUM COMPANY, Dept. 17
111 W. Washington St., Chicago

Send me illustrated literature on Insulex and Gypsolite.

Name.....

Address.....

City..... *State*.....

Name of nearest lumber dealer

.....

UNIVERSAL GYPSUM COMPANY
1153 Conway Bldg., Chicago, Ill.

Manufacturers of Gypsolite, the tried and better gypsum wallboard for construction and repair work. Strong, yet light in weight. Fire-resisting. Will not warp, crack, or shrink.

INSULEX (UNIVERSAL GYPSUM) GYPSUM INSULATION

REG. U. S. PAT. OFF.

Insulex is expanded gypsum, poured between studs, under roof and floors, sealing every crevice. Vermin and ratproof. It is rot proof, and will not deteriorate. Insulex is everlasting.

Initial Announcement of the 2nd National

HEATING AND VENTILATING EXPOSITION

Twelfth Regiment Armory, New York

From Monday, March 14, to Saturday, March 19, 1927, inclusive

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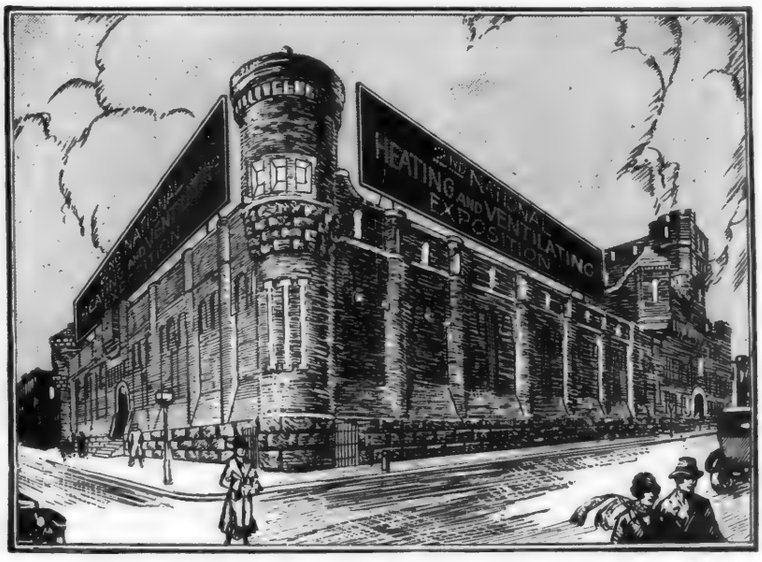
Endorsed by and under the auspices of the

ALLIED HEATING AND VENTILATING EXHIBITORS ASSOCIATION

This is Your Trade's Exposition



Reserve Space Now, thus securing your choice of space

TWELFTH REGIMENT ARMORY, COLUMBUS AVENUE
61ST TO 62ND STREETS. CENTRALLY LOCATED.
Exposition floor is on the street level—not in basement

For particulars and space reservations address the Committee

NATIONAL HEATING AND VENTILATING EXPOSITION

Suite 334, Hotel McAlpin, New York Telephone, Pennsylvania 5700—Extensions 332, 334, 336.

Cork Lined Houses Make Comfortable Homes

Frame house in Birmingham, Michigan (a suburb of Detroit), insulated with 1300 sq. ft. of Armstrong's Corkboard.

If the House is Cork Lined a Smaller Plant Will Heat It

YOU can safely figure on a smaller heating plant for a house insulated with Armstrong's Corkboard. Cork insulation so reduces heat loss through walls and roof that a house can be kept uniformly warm in the coldest weather with much less fuel than would be needed in an uninsulated home.

There is nothing more pleasing to a customer than the assurance that a smaller plant will heat his house. And when he *proves* it, and finds his house comfortable with very little consumption of fuel, he sends his friends to you. He is a satisfied customer.

Don't make the mistake of figuring too much radiation for a house insulated with Armstrong's Corkboard. A cork-lined house may be uncomfortably warm if the plant is too large. If you don't know how much less radiation to allow for cork lining, write to us for the information.

The idea of cork insulation for houses is growing by leaps and bounds. Architects, building contractors, and home builders are adopting it. Cork insulation is an accepted building practice. The time is rapidly approaching when the cork-insulated house will be the rule—the uninsulated house will be out of date.

Reg. U. S. Pat. Off.

ARMSTRONG CORK & INSULATION COMPANY

(Division of Armstrong Cork Company)

202 Twenty-fourth Street, Pittsburgh, Pa. McGill Bldg., Montreal, Que.

Armstrong Cork Company, Ltd., Sardinia House, Kingsway, London, W. C. 2, England

Branches in the Principal Cities of the United States

Armstrong's Corkboard Insulation

A Heatproof Lining for Walls and Roofs

THE
W.D. CASHIN CO.
THERMOFLEX

HEATING SPECIALTIES

No. 1
Thermoflex Trap

Graduate
Inlet
Valve

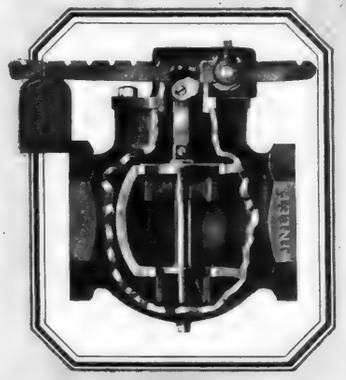
QUALITY—EFFICIENCY—APPEARANCE

The Price is right.

Send for complete catalog and quotations.

For all types of vapor and vacuum heating systems.

MANUFACTURED BY
W. D. CASHIN COMPANY
35 HARTFORD STREET, BOSTON, MASS.



SOME back pressure valves stick when they're hot. But not so with the Davis. They're designed to work even better when the steam heats them than when they're cold. Some back pressure valves call for new springs—repairs—every so often. Not so the Davis. They're constructed with a counterweighted lever, so that the resistance is constant. Those are just two of the superiorities of Davis Back Pressure valves which have put them well up on the preferred list.

G. M. DAVIS REGULATOR CO.
422 Milwaukee Avenue, Chicago, Illinois

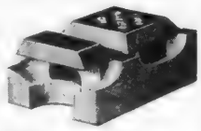
DAVIS VALVE
STEAM SAVERS SINCE 1875
SPECIALTIES

VALVE MAKERS FOR OVER FIFTY YEARS

Well Heated Buildings
Are Well Rented

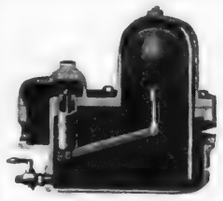
The high efficiency of PYRAMID GRATES assures satisfactory heating.

Also economical because PYRAMID GRATES burn Buckwheat Coal.



Let Us Send Full Details

PYRAMID IRON PRODUCTS CO.
136 Liberty Street NEW YORK CITY



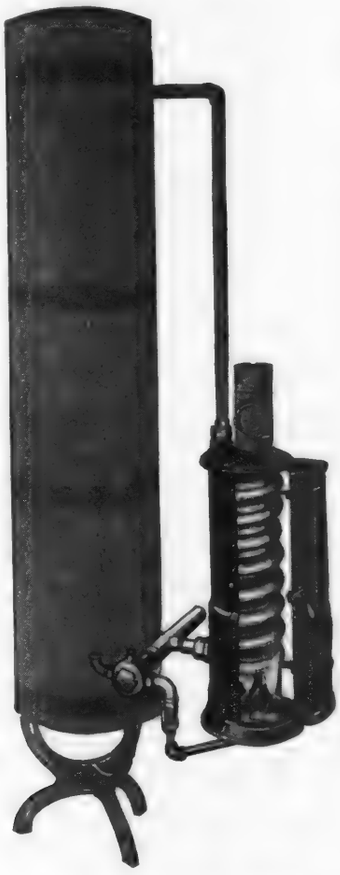
WRIGHT-AUSTIN
"VICTOR"
STEAM TRAPS
Low Pressure

Have very large capacity on low pressures or no pressure at all. Operate on the overflow principle. Very simple and sturdy in construction. Will not get out of order.

Ask for Bulletin No. 201
WRIGHT-AUSTIN CO.
DETROIT, MICH.

STRIKING AN OLD NOTE —BUT A LIVE ONE!

BARBER JET GAS BURNERS



MANUFACTURERS who lead—equip their heaters with Barber Patented Jet Gas Burners.

These Burners have been constantly before the heating industry over a long period of years. They are an old note, but a live one, as is testified by the fact that the best known, and most highly rated heater manufacturers in the country use them as standard equipment. A glance over the names listed at the side will assure you of this.

Barber Patented Jet Gas Burners are gauzeless, operate efficiently without adjustment over wide range of gas conditions. They will not flare back or carbonize; analysis of flue shows complete combustion. They are adaptable to small as well as large heaters.

In all gas districts, it has been found that no Bunsen Burner is free from carbon, fumes, back-firing or servicing.

Among the many Heater Manufacturers who have adopted and are using "Barber Patented Jet Gas Burners" are the following:

American Radiator Company
Barton-Roth Co.
Bastian-Morley Co. (Crane)
Bryan Steam Corporation
Coast Heater Mfg. Co.
Day & Night Water Heater Co.
Franklin Plumbing Supply Co.
Geneva Heater Co.
Gewert Mfg. Co.
Hoffman Heater Co.
Hotstream Heater Co.
Edw. Katzinger Co.
Lovekin Water Heater Co.
The New Way Mfg. Co., Inc.
Piatt Water Htr. Co.
Sands Manufacturing Co.
Snap-O-Stat Co.
Southard Robertson Co.
Superbo Water Heater Co.
Superbo Mfg. Co.
Welsbach Company
Walter Mork Heater Co.

The HOTSTREAM "heats in a hurry." Hotstream Heater Company has found that in order to maintain that standard of heating in a hurry for which their heater is famous, they must use Barber Patented Jet Gas Burners. They have come to rely on BARBER BURNERS exclusively, to uphold their reputation.

BARBER BURNERS may be turned down so low that each pair of Jets will consume, safely, only three-tenths of one cubic foot of gas per hour—if normal drafts or flue conditions prevail.

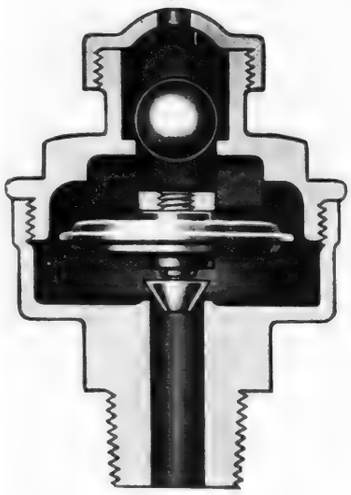
Write for our new Jet Burner Catalog, illustrating our newer designs and giving full information — engineering data — prices and discounts.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, — Cleveland, Ohio

McALEAR

AUTOMATIC AIR VALVES

FOR USE IN CONNECTION WITH LOW PRESSURE, VAPOR OR STEAM HEATING SYSTEMS



No. 14 Valve

GET RID OF THE AIR

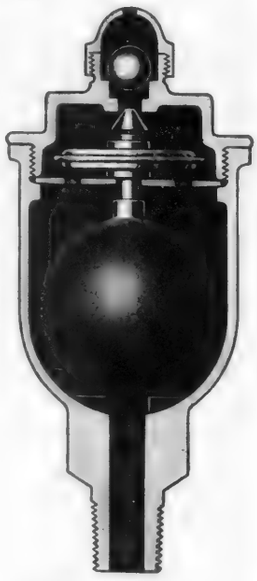
and you have eliminated 90% of your trouble. You can cure sick jobs with these valves—try it.

No. 14 Double Duty Valve—for venting mains, risers, coils, etc. Will close tight against steam and prevent air from re-entering. Sizes—3/8"-1/2"-3/4".

No. 15 Triple Duty Valve—for venting mains, etc. Will close tight against steam and water and prevents return of air. Sizes—1/2"-3/4"-1".

Write for General Catalog No. 28

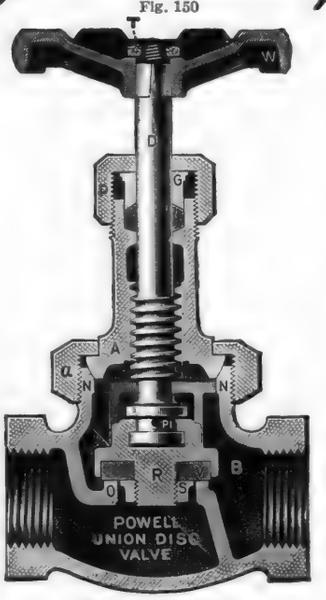
McALEAR MFG. CO.
1901-7 So. Western Ave.
CHICAGO



No. 15 Valve

POWELL VALVES

Fig. 150



Sizes 1/8 to 3 inches

UNION COMPOSITE DISC VALVES

ALWAYS DEPENDABLE

For Hot Water or Steam Heating

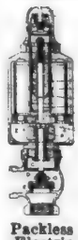
Notice the Union Bonnet Connection

Ask your dealer for Powell Valves

The Wm. Powell Company
Cincinnati, Ohio

GOLD CAR HEATING & LIGHTING NEW YORK U.S.A.

AUTOMATIC
HEAT REGULATION
ELECTRICALLY OPERATED



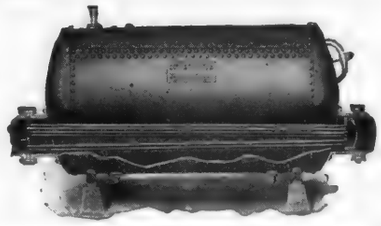
Packless Electric Valve

Whether it be for an isolated room or complete building, Gold's Control will give you that desired equable temperature. Energy derived from the 110 volt lighting current.

Write for General Catalog with Testimonials

Thermostat

GOLD CAR HEATING & LIGHTING CO.
BUSH TERMINAL
220 36th STREET BROOKLYN, N. Y.



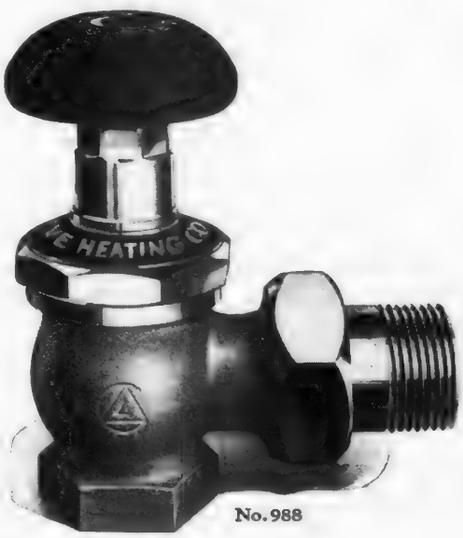
Alberger-Buffalo Storage Heaters have tubes the full length of tank which insures maximum heat transfer. Satisfaction guaranteed. Write for information on Alberger Multi Head Heaters and Howard Guided Expansion Joints.

ALBERGER HEATER COMPANY
HOWARD IRON WORKS
281-289 Chicago St. Buffalo, N. Y.

Several views of the excellently equipped shop of the Inland Heating Company, Chicago, Ill.

SHOEMAKERS' CHILDREN

do not always go barefoot!



No. 988

ARCO PACKLESS VALVES

For steam, water and vapor—large jobs or small. Made in angle, corner and globe patterns. Your name on dial if desired.

HERE is a heating merchant who has made his own shop a model for his customers to follow.

On every radiator in the building there is an Arco Packless Valve.

It pays a dealer to display Arco Packless Valves in this way, because it is so easy to show a customer

—how attractive they look on a radiator

—how quickly and smoothly they open

—that they save the trouble and expense of repacking

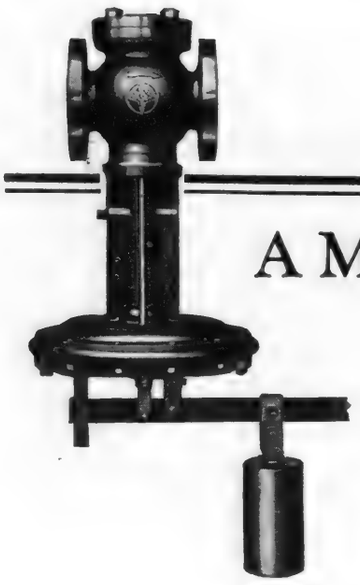
—that they never leak

—that they last as long as the radiator

Arco Packless Valves are manufactured by the world's largest makers of heating equipment.

AMERICAN RADIATOR COMPANY

816 So. Michigan Ave. **Chicago, Ill.**



A Mason Regulator for Heating Systems

The new Mason Lever Style Reducing Valve is simple in design, positive in operation and absolutely accurate in performance.

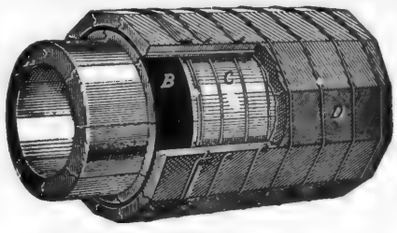
The dependability of Mason Regulators is universally recognized. The performance of every Mason Reducing Valve is guaranteed. It is proved by a thorough operating test before it leaves the factory.

We would be pleased to send you Catalog 62 which contains more complete information.

Mason Regulators
MASON REGULATOR CO.
Boston, Mass

9123

Wyckoff's Improved Cypress Covering

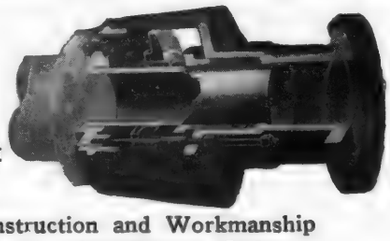


Lasts as Long as The Pipe Itself

As well as being highly efficient in its application, Wyckoff Improved Cypress Steam Pipe Covering withstands all conditions attending steam pipe trenches. All engineers who know Wyckoff Pipe covering specify it because it lasts.

A. WYCKOFF & SON CO. ELMIRA, N. Y.

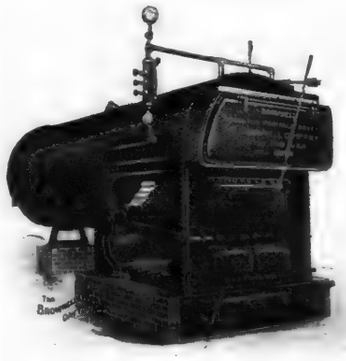
ROSS Crosshead-GUIDED Expansion Joint Excels in



Design, Construction and Workmanship
Over 60% of sales—Repeat Orders
Once Used—Always Demanded
Every Purchaser—A Customer

ROSS HEATER & MFG. CO., INC., BUFFALO, N. Y.

New York, Chicago, Philadelphia, Boston, Cleveland, St. Louis, Detroit, Pittsburgh, Baltimore, San Francisco, Seattle, Denver, Salt Lake City, Omaha, Montreal, Toronto.



Brownell Return Flue Portable Heating Boiler—Smokeless Type

BROWNELL

Better Boilers for Heating and Power Purposes
70TH YEAR

of successful manufacturing experience. This is the reason why Brownell Boilers are specified by all the leading Heating and Contracting Engineers.

BROWNELL Steel Heating Boilers are
LOW IN FIRST COST
HIGH IN EFFICIENCY
BUILT TO LAST A LIFETIME

Our reputation is your insurance of a high quality product. Let us solve your heating problems. Sales representatives in all principal cities. Send for them.

THE BROWNELL CO.
DAYTON, OHIO

THE BROWNELL COMPANY The World Over DAYTON, OHIO, U.S.A.

Established 1855

Send for Bulletins B6 B6A

BOILERS

VINCO

Latin: *"I conquer"*

AT LAST—a simple safe sure treatment that conquers priming, foaming, surging and sluggish steaming by removing their causes—a cleanser that produces results without the expense and nuisance of blowing off the boiler.

AS THE finishing touch to put a well engineered new or remodeled heating system into first-class operating condition before turning it over to the owner, Vinco treatment is the Engineer's and Contractor's best protection against unnecessary conferences, arguments, "buck passing," bad temper and withheld final payments.

A heating system cleansed with Vinco is conspicuous for its free steaming, steady water level, easy circulation and care-free boiler attendance from the start and afterwards for the efficient absorption of all usable furnace heat.

Give your customers this protection and you will promote your business reputation and your business profits. One trial of Vinco will make you as enthusiastic as those whose testimony we quote.

Vinco is a potent enemy of grease, oil, core sand, rust, scale and mud. It does not merely and temporarily blanket the water level, but attracts, holds and carries down several times its own weight of impurities to where they can be drained out for all time. As Vinco is insoluble and free from potash, lye, soda, sperm oil and acid, it will not attack or otherwise interfere with any part of the heating system. We guarantee this as well as complete elimination of all priming, foaming, surging and sluggishness from the usual causes.

Compare this simple procedure with your usual expense for blowing out:

Mix Vinco in a bucket of hot water, remove safety valve, pour the mixture into the opening, replace the safety valve and refill boiler to water line. Drain and replace 2 in. of water every morning during 36 steaming hours, and then drain and completely refill the boiler. Even an extreme amount of core sand and oil will seldom resist this treatment but if some does, a second application will unfailingly complete the job.

Afterwards, a very little Vinco added at the beginning of the heating season and left in will keep all internal surfaces thoroughly clean.

Vinco ingredients, processing and application are protected from infringement, and Vinco is never sold in bulk. For safety and full benefits, accept only cans bearing our name and registered trade mark. Buy from your jobber or if necessary, direct from us. Mail the coupon.

THESE MEN KNOW

Follow their judgment and you can't go wrong.

"The heating plant at Edgewood School, Scarsdale, N. Y., retained excessive oil and filth in spite of all draining and flushing, and circulation required 1½-lb. pressure. Thorough cleaning out with Vinco, produced complete circulation without pressure showing on the gauge."—Rossiter & Muller, Architects, New York.

"We used Vinco in eight heating systems where boilers were foaming. Since discovering Vinco, our people use no other."—James H. Merritt, Prest., James H. Merritt & Co., New York.

"On applying Vinco to a boiler at Haverford, priming ceased entirely and operation is most satisfactory. I recommend Vinco."—W. M. Anderson, Steam Fitter, Philadelphia.

"We specified Vinco for cleaning oil and grease out of boilers and heating systems on fourteen different jobs. The results were often brilliant. One old heating plant, which had never given proper service, has been entirely satisfactory ever since."—G. E. Zibold, V. P., Zibold & Donahue Co., Inc., Brooklyn, N. Y.

"We use 'Vinco' for every steam boiler we put in—and for every job we go on."—Edw. J. Sullivan, Domestic Engineer, Kenosha, Wis.

"The boiler at 127 W. 79th St. primed severely, but since applying Vinco the priming has ceased entirely and operation is most satisfactory. Vinco is certainly worthy of high recommendation."—R. A. Wolff, Wolff & Munier, Inc., New York.

"A gas-fired boiler seldom got steam to the far end of the building. After using Vinco, steam could be circulated with just a few ounces of pressure."—Walter A. Klein, Prest., Klein Heating Company, St. Louis, Mo.

"Very satisfactory use of Vinco in several foaming boilers makes us believe in it. On one good-sized job water left the boiler at 3-oz. pressure, but after applying Vinco there was no further trouble."—E. W. Mandeville, Inc., Brooklyn, N. Y.

"Vinco will do all you claim. We recommend it on all our steam jobs."—P. M. Place, Supt., Heating Division, The Wm. P. Kirk Co., Bridgeport, Conn.

"A vapor system at Haverford would not heat although the engineers blew down the boiler about six times. Vinco was tried and the boiler is now working properly. I recommend Vinco."—A. D. Warnock, Philadelphia.

VINCO *is endorsed and specified by boiler and radiator manufacturers*

THE VINCO COMPANY, INC.,
75 Vesey St., New York.

Please advise where Vinco may be obtained and at what cost to clean out a heating system with _____ sq. ft. of radiation.

Name .....

Address .....

.....

H&V

Scott Bronze Gate Valves

No. 0	—S.E. Solid Wedge—Non-rising Stem	125 lbs. S.W.P.
No. 1	—S.E. Split Wedge—Non-rising Stem	125 lbs. S.W.P.
No. 2	—F.E. Split Wedge—Non-rising Stem	125 lbs. S.W.P.
No. 8	—S.E. Hose Gate—Non-rising Stem	125 lbs. S.W.P.
No. 22	—S.E. Quick Opening Gate—	125 lbs. S.W.P.
No. 23	—F.E. Quick Opening Gate—	125 lbs. S.W.P.
No. 170	—S.E. Solid Wedge—Non-rising Stem	150 lbs. S.W.P.
No. 171	—F.E. Solid Wedge—Non-rising Stem	125 lbs. S.W.P.
No. 172	—S.E. Solid Wedge—Non-rising Stem	175 lbs. S.W.P.
No. 173	—F.E. Solid Wedge—Non-rising Stem	175 lbs. S.W.P.
No. 41	—S.E. Solid Wedge—Non-rising Stem	250 lbs. S.W.P.
No. 42	—F.E. Solid Wedge—Non-rising Stem	250 lbs. S.W.P.
No. 1-A	—S.E. Solid Wedge—O.S.&Y.	150 lbs. S.W.P.
No. 172-A	—S.E. Solid Wedge—O.S.&Y.	175 lbs. S.W.P.
No. 41-A	—S.E. Solid Wedge—O.S.&Y.	250 lbs. S.W.P.

Scott Iron Body Gate Valves

No. 35	F.E. Inside Screw—Single Disc	40 lbs. S.W.P.
No. 35-A	—F.E. O.S.&Y.—Single Disc	40 lbs. S.W.P.
No. 300	—F.E. Inside Screw—Solid Wedge	100 lbs. S.W.P.
No. 301	—S.E. Inside Screw—Solid Wedge	100 lbs. S.W.P.
No. 431	—S.E. Inside Screw—Split Wedge	125 lbs. S.W.P.
No. 432	—F.E. Inside Screw—Split Wedge	125 lbs. S.W.P.
No. 433	—S.E. O.S.&Y.—Split Wedge	125 lbs. S.W.P.
No. 434	—F.E. O.S.&Y.—Split Wedge	125 lbs. S.W.P.
No. 637	—S.E. Inside Screw—Solid Wedge	175 lbs. S.W.P.
No. 638	—F.E. Inside Screw—Solid Wedge	175 lbs. S.W.P.
No. 639	—S.E. O.S.&Y.—Solid Wedge	175 lbs. S.W.P.
No. 640	—F.E. O.S.&Y.—Solid Wedge	175 lbs. S.W.P.
No. 843	—S.E. Inside Screw—Solid Wedge	250 lbs. S.W.P.
No. 844	—F.E. Inside Screw—Solid Wedge	250 lbs. S.W.P.
No. 845	—S.E. O.S.&Y.—Solid Wedge	250 lbs. S.W.P.
No. 846	—F.E. O.S.&Y.—Solid Wedge	250 lbs. S.W.P.
No. 847	—S.E. O.S.&Y.—With By-pass	250 lbs. S.W.P.
No. 848	—F.E. O.S.&Y.—With By-pass	250 lbs. S.W.P.

Famous Scott No. 1 Bronze Gate Valve

No. 434 Scott I. B. Gate Valve

No. 3

There's a Scott Valve for every job you have

The Scott Line is practically complete. For your convenience in ordering by Figure Number we list herewith and in succeeding advertisements Scott Valves for every service.

Scott Gate Valves are full weight, rugged in construction, and are made of the highest grade bronze or iron. They have an enviable record over a period of 40 years for dependable and efficient service.

SCOTT VALVE MANUFACTURING COMPANY, 3962 McKINLEY AVENUE DETROIT MICHIGAN

Manufacturers of the Complete Line of

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"MAXIMUM SERVICE PER DOLLAR"

CORRECTLY DESIGNED

Cast Iron Blow Off Basins

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APPROVED GARAGE BASIN EQUIPMENT

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CENTRAL STATION STEAM CO.

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MANUFACTURERS OF

Cadillac Condensation Meters

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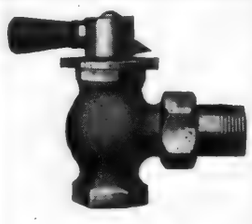
Packingless Expansion Joints and other special fittings for underground steam distribution mains.



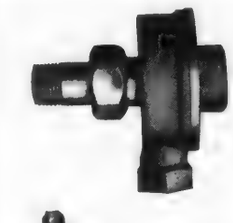
A Dependable Line of Heating Specialties

Stay-Rite Heating Specialties are dependable because they are made right and in strict accordance with heating requirements. They have long since passed the experimental stage. And over many heating seasons they have justified the confidence of their owners and proved the high efficiency of the Stay-Rite Line.

Write for literature and prices

The Ideal Heating Equipment Co.

1250 West 4th Street CLEVELAND, OHIO



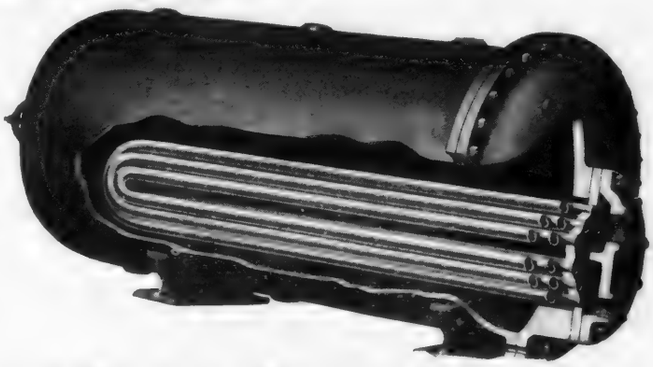
NATIONAL

STORAGE U-BEND TYPE HEATERS

Every Installation Individually Engineered

There is one sure way to deliver a heater that will live up to all expectations or exceed them. It is the National policy of designing each heater for the particular work it must do, and National has built up a long record of successful installations by careful attention to all conditions to be met. When you install a National Heater you get far more than coils, shell, and promises. You are guaranteed perfection in every mechanical detail, in materials and design. There are no short cuts in building high grade heaters that will deliver hot water 24 hours a day and give extra long service without repair.

National Heaters are installed in Schools, Hotels, Clubs, Apartment Houses, Colleges, Gymnasiums, Y. M. C. A.'s Office and Municipal Buildings.

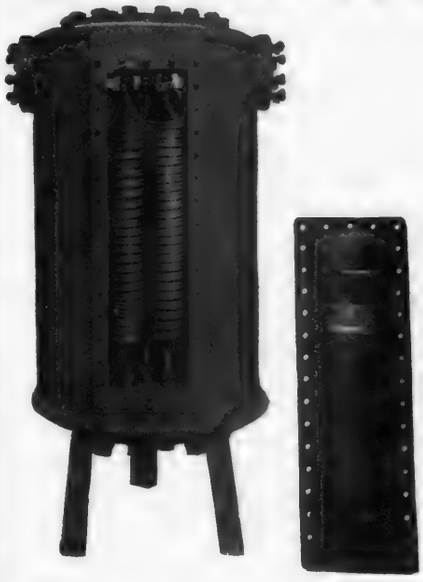


Get acquainted with National Heaters. Send for our engineers and for bulletin 65.

THE NATIONAL PIPE BENDING CO.
(Est. 1883)
120 River St.,
New Haven, Conn.
Boston New York
Philadelphia

The Standard Storage Heater for all Large Buildings

Hotter Water with Less Fuel—



The Reilly Water Heater

has the highest rate of heat transfer of any closed heater on the market. Besides its unequalled efficiency, several special features of construction make it the best heater for dependable year-in, year-out, service.

Every coil and joint of the Reilly Water Heater can be inspected and made tight *while under pressure and without breaking any pipe joint* —an exclusive Reilly Heater feature.

Expansion strains on headers or tubes are prevented by the spring-like crimped coils—another exclusive Reilly Heater feature.

Send the coupon for complete information

The Griscom-Russell Company

Dept. H, 285 Madison Ave., New York

Philadelphia	Chicago	St. Louis	San Francisco
Boston	Detroit	New Orleans	Los Angeles
Rochester	Cleveland	Dallas	Seattle
Pittsburgh	Milwaukee	Houston	Salt Lake City
Columbus	Minneapolis	Atlanta	Tulsa
Indianapolis	Kansas City	Charlotte	Denver

For Canada: Riley Engineering and Supply Co., Ltd., Toronto

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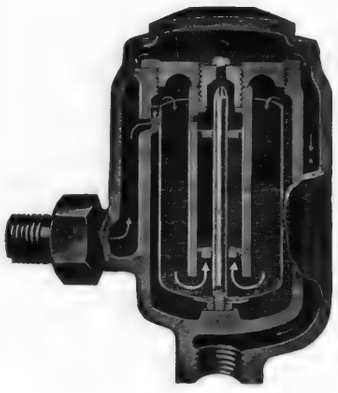
ADDRESS .....

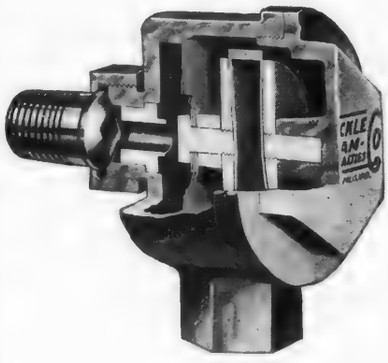
The Griscom-Russell Company,
Dept. H, 285 Madison Ave., N. Y. C.
New York.
Send me at once without charge
copy of your bulletin describ-
ing the Reilly Water Heater.

H&VM-5-26

STICKLE RADIATOR TRAPS



Installations ten and twelve years old. Still in satisfactory service in large establishments are to the credit of the trap to the left.



Are you getting tired of changing traps on the same job every few years? We solicit your inquiries on the Stickle (Patented) Bucket Type Radiator Trap. All sizes from ½" to 2" inlets and outlets.

Look at the Stickle Thermostatic Radiator Trap? Don't you think it has some good points, with the loose diaphragm, flat leaf spring, and position of valve and seat? See how the diaphragm is protected. It is patented. Yet you will be surprised at the low price, but not unless you will let us get in touch with you. Drop us a line now.

STICKLE STEAM SPECIALTIES CO.

NEW YORK **Indianapolis, Ind.** BOSTON

Edition No 2! Write for it.

This is ATLAS Jr. No. 21. The only difference between this and the first edition is that Edition No. 2 includes our new Campbell Feed Water Regulator.

If you have no copy whatever and are interested in regulating valves you should by all means have one.

ATLAS VALVE COMPANY
REGULATING VALVES FOR EVERY SERVICE
281 South St., Newark, N. J.

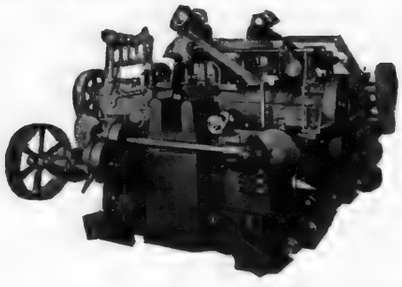
Radiator Brackets

York Wrought Steel Radiator Brackets will save you money in installing radiators, for no wall strips are required. Brackets fasten with lag screws or expansion bolts, and oval bolt holes allow adjustment for leveling or pitching. They are the lowest priced brackets on the market.

Twelve sizes carried in stock. Write for catalog, prices and discount.

York Heating & Ventilating Corp.
1506 Locust Street, PHILADELPHIA

BRYANT RADIATOR MACHINERY

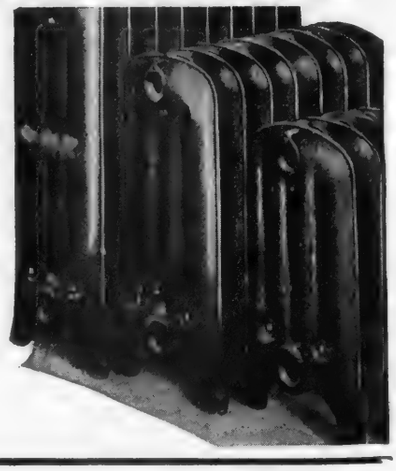


Four Spindle Horizontal Radiator Boring Machine Bores 240 Loops per hour.

This machine may also be had with automatic conveyor by which the above production may be *doubled*.

This Bryant Radiator Boring Machine completes all the boring on a radiator loop in every cycle of the machine. One operator tends the machine—he has but to place the work and touch a lever to clamp. Unclamping is automatic and loop must simply be removed. Machine is fully adjustable for holes from 8" to 45" center to center and 4" to 14" in width.

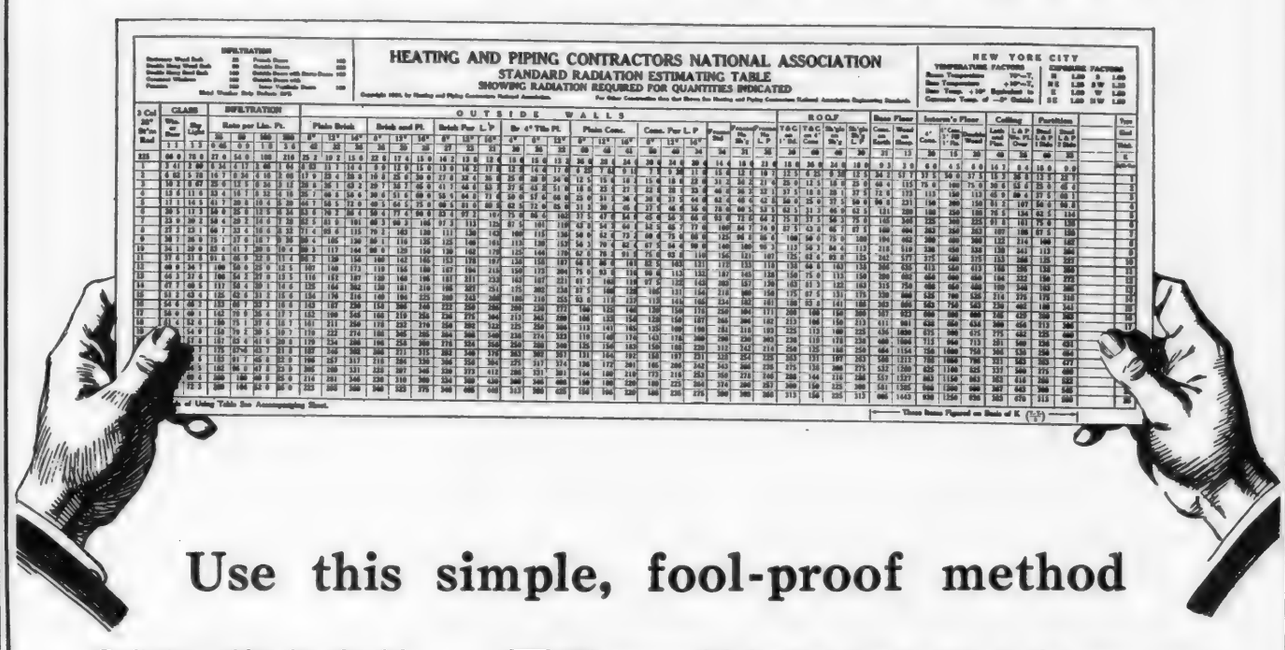
We are makers also of a full line of radiator and nipple assembling, tapping, boring, facing, drilling and testing machines, automatic and semi-automatic. Consult with us.



Third generation of Bryant's making Radiator Machinery

O. Bryant Sons & Company, 366 Ontario St., Buffalo, N. Y.

The successful heating contractor knows most about RADIATION


HEATING AND PIPING CONTRACTORS NATIONAL ASSOCIATION
STANDARD RADIATION ESTIMATING TABLE
SHOWING RADIATION REQUIRED FOR QUANTITIES INDICATED

Use this simple, fool-proof method

Radiation tables for the following cities have been prepared by the Heating and Piping Contractors National Association:

Birmingham, Ala.
Boston, Mass.
Buffalo, N. Y.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
Denver, Colo.
Eastport, Me.
Kansas City, Mo.
Los Angeles, Cal.
Madison, Wis.
Memphis, Tenn.
Milwaukee, Wis.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
San Francisco, Cal
Salt Lake City, Utah,
San Antonio, Texas
St. Louis, Mo.
St. Paul, Minn.
Washington, D. C.

Note: If your city is not listed, request chart for city nearest to your locality.

THE successful heating contractor is the one who knows most about Radiation. His installations deliver **enough heat,** at the smallest fuel cost.

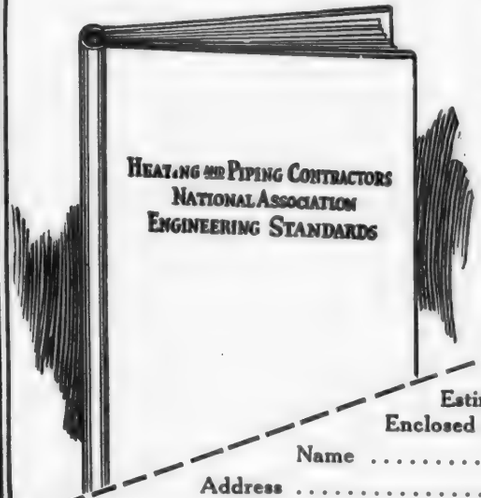
To determine the proper radiation in advance is no longer a problem, no longer guess work. The Heating and Piping Contractors National Association has reduced radiation estimating to a science—guess work and rule of thumb methods can be eliminated. The contractor need take no chances.

The Committee on Standardization of this nation-wide 37 year old organization of heating and piping contractors has expended over $100,000 in time and effort in an exhaustive study of radiation.

Complete radiation information is contained in a loose-leaf book entitled "Engineering Standards" and now made available to every heating contractor at a nominal cost of $5.00—a sum infinitesimal in comparison with its big value to the contractor.

All data to **figure radiation accurately** included: 151 constants for various types of construction and thickness of wall; infiltration factors and exposure factors are given.

Standard Radiation Estimating Tables for the twenty-four cities listed at the left are available in addition to this comprehensive book.



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HEATING AND VENTILATING MAGAZINE,
1123 Broadway, New York, N. Y.

Date.....

Send me copy of "Engineering Standards" complete with all data necessary to correctly estimate radiation in any type of building. Also include Radiation Estimating Table for City of.....

Enclosed find check for $5.00 to cover cost and postage.

Name .....

Address .....

City and State.....

"Keeping Others In Hot Water"—

for
Hotels, apartment buildings, hospitals, Y. M. C. A. buildings, schools and laundries

Special Attention Given to Installations Requiring Large Quantities of Hot Water, with Live or Exhaust Steam as the Heating Medium.

—may be a pastime for some folks, but for the Sims Company it is a serious proposition—a matter requiring a thorough knowledge of hot water requirements.

A long study of these requirements enables us to offer heaters that assure constant and efficient hot water service.

Engineers feel safe in specifying "SIMS" because they know it means **reliability**—a service you want to render your client.

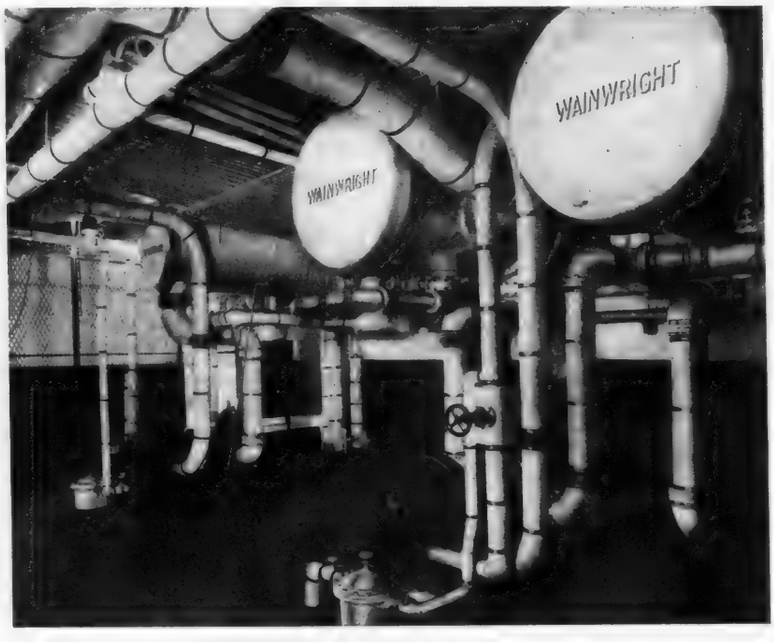
SIMS CLEAN E-Z STEAM TUBE STORAGE HEATER

Our Engineers will gladly confer with you, without obligation, on your hot water problems.

THE SIMS CO.

Erie, Pa.

A good place to live, to work and to play.



Wainwright Heaters in the plant of the Morse Twist Drill Co., New Bedford, Mass.

IF you design hot water systems you will want our Bulletin H-54.

This bulletin gives the capacities of Wainwright Heaters when heating water over different temperature ranges. The dimensions of standard Wainwright heaters with installation drawings are also included. Wainwright Heaters are of the instantaneous type, heating water when, and as, needed. They may be supplied with straight or corrugated tubes as required by operating conditions.

Floating tube heads eliminate expansion and contraction strains due to the rapid changes in temperature encountered in service. These heaters, in addition to being used for hot water service heaters, are also adapted to use as hot water heating system heaters, boiler feed water heaters, etc.

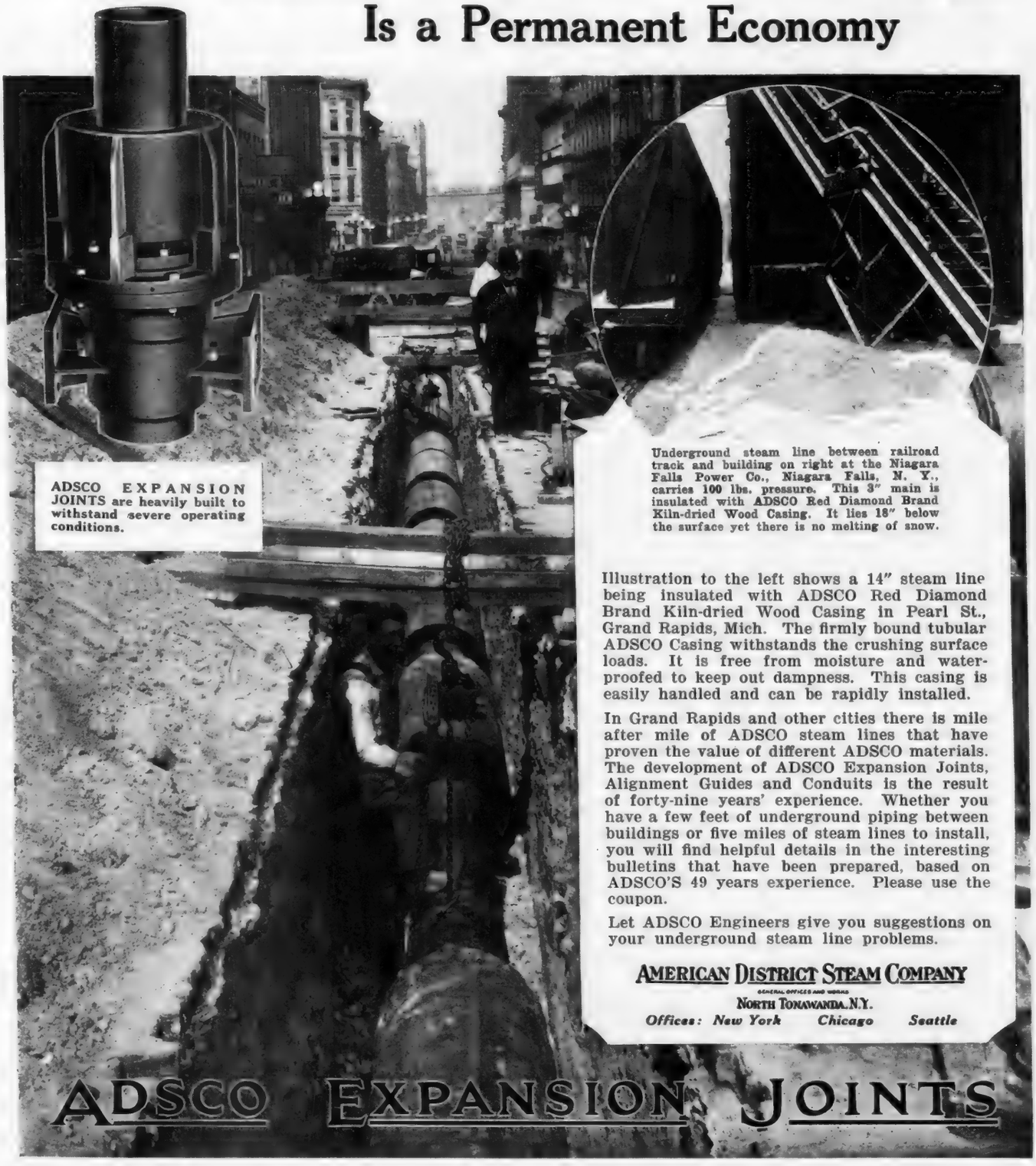
WHEELER CONDENSER & ENGINEERING CO.

Main Office--149 Broadway, New York City

Works--CARTERET, N. J. and NEWBURGH, N. Y.

61

This Underground Steam Line in Grand Rapids Is a Permanent Economy



ADSCO EXPANSION JOINTS are heavily built to withstand severe operating conditions.

Underground steam line between railroad track and building on right at the Niagara Falls Power Co., Niagara Falls, N. Y., carries 100 lbs. pressure. This 3" main is insulated with ADSCO Red Diamond Brand Kiln-dried Wood Casing. It lies 18" below the surface yet there is no melting of snow.

Illustration to the left shows a 14" steam line being insulated with ADSCO Red Diamond Brand Kiln-dried Wood Casing in Pearl St., Grand Rapids, Mich. The firmly bound tubular ADSCO Casing withstands the crushing surface loads. It is free from moisture and water-proofed to keep out dampness. This casing is easily handled and can be rapidly installed.

In Grand Rapids and other cities there is mile after mile of ADSCO steam lines that have proven the value of different ADSCO materials. The development of ADSCO Expansion Joints, Alignment Guides and Conduits is the result of forty-nine years' experience. Whether you have a few feet of underground piping between buildings or five miles of steam lines to install, you will find helpful details in the interesting bulletins that have been prepared, based on ADSCO'S 49 years experience. Please use the coupon.

Let ADSCO Engineers give you suggestions on your underground steam line problems.

AMERICAN DISTRICT STEAM COMPANY
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installed in
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It was not merely chance that caused the installation of the Mouat Heating System in the Homestead Hospital, of which Press C. Dowler is the Architect and the Pittsburgh Heating Company the Contractors.

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A two-pipe gravity vapor or atmospheric steam heating system operates at from 1 to 3 ounces pressure. No mechanically operated parts, no pumps or return traps are necessary.

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CLEVELAND, OHIO

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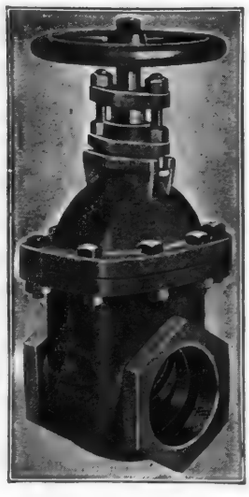

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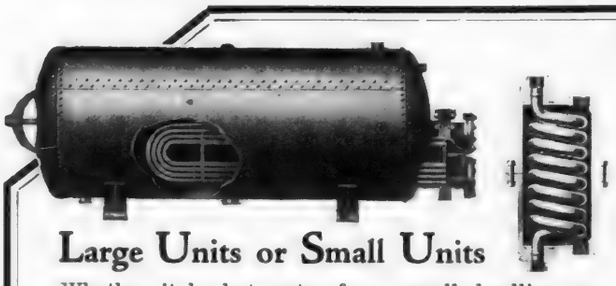

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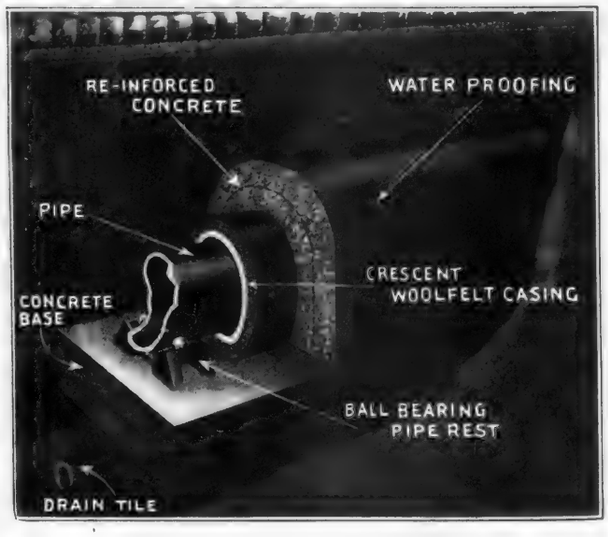

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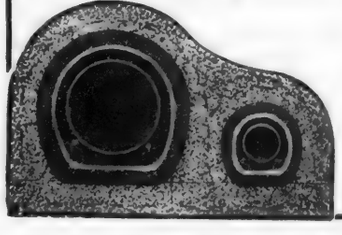

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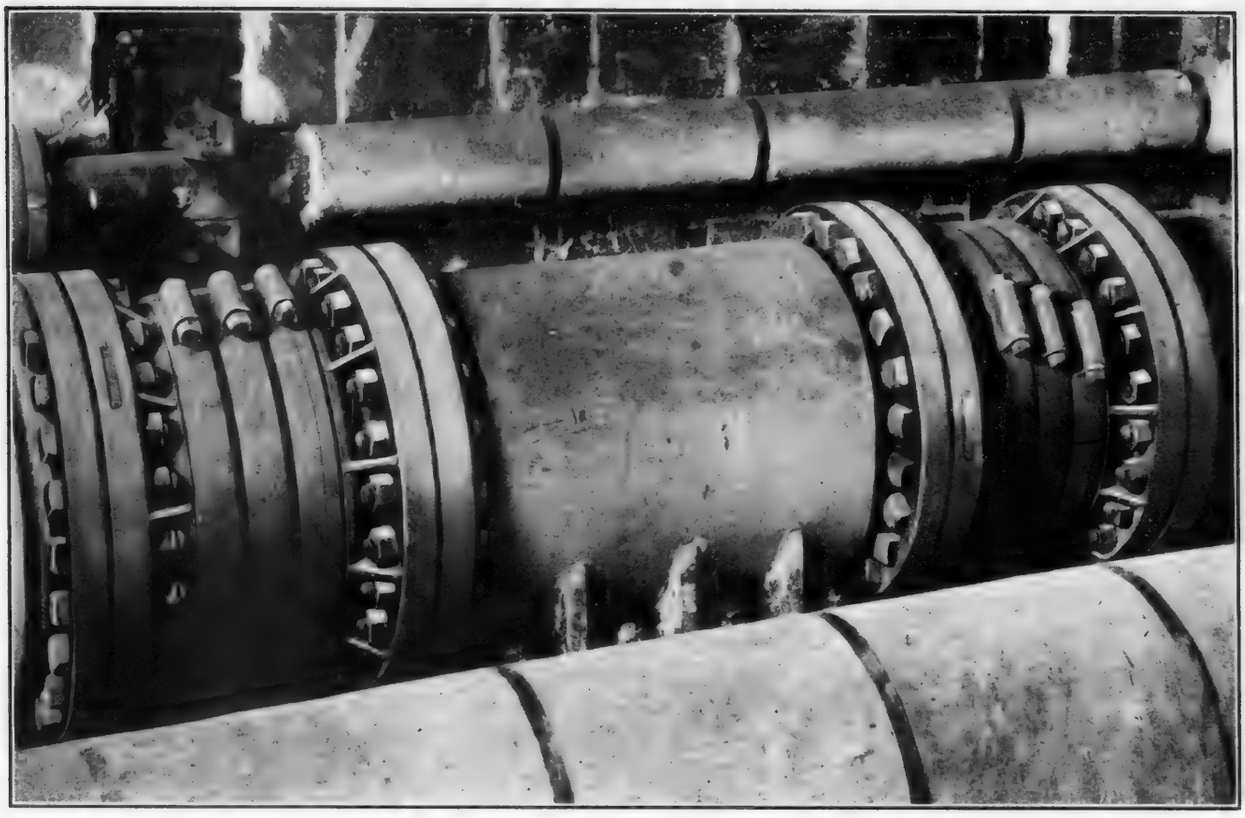

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Fleisher Co., Inc., W. L. New York.
Grinnell Company, Providence, R. I.
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Massachusetts Blower Co., Watertown, Mass.
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New York Blower Co., Chicago, Ill.
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Buffalo Forge Co., Buffalo, N. Y.
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Cooling Tower Co., New York.
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Autovent Fan & Blower Co., Chicago, Ill.
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Buckeye Blower Co., Columbus, Ohio.
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New York Blower Co., Chicago, Ill.
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L. J. Wing Mfg. Co., New York.
York Heating & Ventilating Co., Philadelphia, Pa.

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Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
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Ofeldt Gas Boiler Sales Corp, Chicago, Ill.

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Brownell Co., The, Dayton, O.
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Frost Mfg. Co., Chicago, Ill.
General Boilers Co., Waukegan, Ill.
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Bayley Mfg. Co., Milwaukee, Wis.
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Cooling Tower Co., New York.
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Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

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Supplied in Standard Units of Seven Capacities

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Study These Outstanding Features

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Other important features are the non-wearing parts of the vacuum-producing element—the Young Exhauster—the provision of proper electrical control and protection, and the fact that the pump and all parts coming into contact with water are unaffected by any foreign matter which may pass through the strainer.

THE YOUNG PUMP COMPANY, 450 East Ohio St., Chicago

YOUNG PUMP COMPANY

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Wing Mfg. Co., L. J., New York.
York Heating & Ventilating Co., Philadelphia, Pa

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Dahlquist Mfg. Co., Boston, Mass.
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Hornung, J. C., Chicago, Ill.
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Illinois Engineering Co., Chicago, Ill.
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Ric-Wil Co., Cleveland, O.
Ross Heater & Mfg. Co., Buffalo, N. Y.
Webster & Co., Warren, Camden, N. J.
Wheeler Condenser & Engineering Co., Carteret, N. J.

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Bayley Mfg. Co., Milwaukee, Wis.
Buckeye Blower Co., Columbus, O.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
DeBothezat Engineering Co., New York.
Ilg Electric Ventilating Co., Chicago, Ill.
Massachusetts Blower Co., Watertown, Mass.
New York Blower Co., Chicago, Ill.
Pecco, Inc., St. Louis, Mo.
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Skinner Bros. Mfg. Co., St. Louis, Mo.
Sturtevant Co., B. F., Hyde Park, Mass.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
L. J. Wing Mfg. Co., New York.
York Heating & Ventilating Co., Philadelphia, Pa

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McDonnell & Miller, Chicago, Ill.

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Davis Engineering Corp., New York.
Griscom-Russell Co., New York.

Feed-Water.
Davis Engineering Co., New York.
Ross Heater & Mfg. Co., Buffalo, N. Y.

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American District Steam Co., No. Tonawanda, N. Y.
Clow and Sons, Jas. B., Chicago, Ill.
Grinnell Company, Providence, R. I.

FLANGES.
American District Steam Co., No. Tonawanda, N. Y.
Jenkins Bros., New York.

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Cleveland Gas Burner & Appliance Co., Cleveland, Ohio.
Franklin Gas Burner Mfg. Co., Cincinnati, O.

GASKETS, METALLIC.
Sarco Co., New York.

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Bristol Co., Waterbury, Conn.
Foxboro Co., Inc., The, Foxboro, Mass.
McAlear Mfg. Co., Chicago, Ill.
Marsh & Co., Jas. P., Chicago, Ill.
Webster & Co., Warren, Camden, N. J.

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Altitude
Pierce, Butler & Pierce Mfg. Co., New York.

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Foxboro Co., Inc., The, Foxboro, Mass.
Marsh & Co., Jas. P., Chicago, Ill.

Hydraulic.
American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Foxboro Co., Inc., The, Foxboro, Mass.
Marsh & Co., Jas. P., Chicago, Ill.

Ounce Graduated.
Marsh & Co., Jas. P., Chicago, Ill.
O-E Specialty Co., Milwaukee, Wis.

Pressure.
American Dist. Steam Co., North Tonawanda, N. Y.
American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Bristol Co., Waterbury, Conn.
Foxboro Co., Inc., The, Foxboro, Mass.
Marsh & Co., Jas. P., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
O-E Specialty Mfg. Co., Milwaukee, Wis.
Pierce, Butler & Pierce Mfg. Co., New York.
Webster & Co., Warren, Camden, N. J.
Bishop & Babcock Co., Cleveland, Ohio.

Vacuum.
American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Bristol Co., Waterbury, Conn.
Foxboro Co., Inc., The, Foxboro, Mass.
Marsh & Co., Jas. P., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Pierce, Butler & Pierce Mfg. Co., New York.
Webster & Co., Warren, Camden, N. J.

Vacuum (Compound).
Cashin Co., W. D., Boston, Mass.
Pierce, Butler & Pierce Mfg. Co., New York.

Water.
American District Steam Co., No. Tonawanda, N. Y.
American Schaeffer & Budenburg Corp., Brooklyn, N. Y.
Bristol Co., Waterbury, Conn.
Bristol Co., Waterbury, Conn.
Jenkins Bros., New York.

GENERATOR COOLING SYSTEMS.
Badger & Sons Co., E. B., Boston, Mass.
Bayley Mfg. Co., Milwaukee, Wis.
Carrier Air Conditioning Co., of America, Buffalo, N. Y.
Cooling Tower Co., New York.
Spray Engineering Co., Boston, Mass.
Sturtevant Co., B. F., Hyde Park, Mass.

GOVERNORS, (Pump).
Atlas Valve Co., Newark, N. J.
Davis Regulator Co., G. M., Chicago, Ill.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Mason Regulator Co., Boston, Mass.
Stickle Steam Specialties Co., Indianapolis, Ind.
Westinghouse Elec. &. Mfg. Co., East Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.

GRATES
Dumping
Pyramid Iron Products Co., New York.

Rocking
Pyramid Iron Products Co., New York.

Shaking
Pyramid Iron Products Co., New York.

Shaking and Dumping
Pyramid Iron Products Co., New York.

Shaking, Circular
Pyramid Iron Products Co., New York.

Stationary
Pyramid Iron Products Co., New York.

HEATERS.
Domestic Water.
Alberger Heater Co., Buffalo, N. Y.
American District Steam Co., No. Tonawanda, N. Y.
American Radiator Co., Chicago, Ill.
Badger & Sons Co., E. B., Boston, Mass.
Burnham Boiler Corp., Irvington, N. Y.
Dahlquist Mfg. Co., Boston, Mass.
Davis Engineering Co., New York.
Everhot Heater Co., Detroit, Mich.
Excelso Specialty Works, Buffalo, N. Y.
National Pipe Bending Co., New Haven, Conn.
Page Boiler Co., Wm. H., New York.
Patterson-Kelley Co., New York.
Pierce, Butler & Pierce Mfg. Co., New York.
Ross Heater & Mfg. Co., Buffalo, N. Y.
Sims Co., Erie, Pa.
Standard Heater Co., Williamsport, Pa.
Thermal Appliance Co., New York.
Whitlock Coil Pipe Co., Hartford, Conn.

Electrical Unit
Ilg Electric Ventilating Co., Chicago, Ill.

Feed Water, (Closed).
Alberger Heater Co., Buffalo, N. Y.
Davis Engineering Co., New York.
Griscom-Russell Co., New York.
McAlear Mfg. Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., New York.
Ross Heater & Mfg. Co., Buffalo, N. Y.
Sims Co., Erie, Pa.
Wheeler Condenser & Engineering Co., Carteret, N. J.
Whitlock Coil Pipe Co., Hartford, Conn.

Feed Water, (Open).
Griscom-Russell Co., New York.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Webster & Co., Warren, Camden, N. J.

Fuel-oil.
Alberger Heater Co., Buffalo, N. Y.
American Blower Co., Detroit, Mich.
Davis Engineering Corp., New York.
Drying Systems, Inc., Chicago, Ill.
Griscom-Russell Co., New York.
National Pipe Bending Co., New Haven, Conn.
Ross Heater & Mfg. Inc., Buffalo, N. Y.
Whitlock Coil Pipe Co., Hartford, Conn.

Air, Fan System.
Aerofin Corporation, Newark, N. J.
American Blower Co., Detroit, Mich.
American Radiator Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
Bayley Mfg. Co., Milwaukee, Wis.
Buckeye Blower Co., Columbus, O.
Buffalo Forge Co., Buffalo, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Drying Systems, Inc., Chicago, Ill.
Massachusetts Blower Co., Watertown, Mass.
New York Blower Co., Chicago, Ill.
Sturtevant Co., B. F., Hyde Park, Mass.

Magazine Feed
Standard Heater Co., Williamsport, Pa.

Portable Unit Air.
American Blower Co., Detroit, Mich.
Autovent Fan & Blower Co., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.
Dwyer Equipment Co., Chicago, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Pecco Incorporated, St. Louis, Mo.
Skinner Bros. Co., St. Louis, Mo.
Sturtevant Co., B. F., Hyde Park, Mass.
L. J. Wing Mfg. Co., New York.
York Heating & Ventilating Co., Philadelphia, Pa
(See also Ventilators, Portable Unit.)

HEATING SYSTEMS.
"Gasteam".
James B. Clow & Sons, Chicago, Ill.

Vacuum.
Barnes & Jones, Boston, Mass.
Bishop & Babcock Co., Cleveland, Ohio.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Illinois Engineering Co., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Marsh & Co., Jas. P., Chicago, Ill.
O-E Specialty Co., Milwaukee, Wis.
Sarco Co., New York.
Standard Heater Co., Williamsport, Pa.
Sterling Engineering Co., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind
Webster & Co., Warren, Camden, N. J.

Vapor.
American District Steam Co., No. Tonawanda, N. Y.
Barnes & Jones, Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Gorton & Lidgerwood Co., New York.
Grinnell Company, Providence, R. I.
Haines & Co., Wm. S., Philadelphia, Pa.
Ideal Heating Equip. Co., Cleveland, Ohio.
Illinois Engineering Co., Chicago, Ill.
Illinois Malleable Iron Co., Chicago, Ill.
Marsh & Co., Jas. P., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Mouat Vapor Heating Co., Cleveland, O.
Nelson Corporation, Herman, Moline, Ill.
O-E Specialty Mfg. Co., Milwaukee, Wis.
Sarco Co., New York.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Standard Heater Co., Williamsport, Pa.
Sterling Engineering Co., Milwaukee, Wis.
Trane & Co., La Crosse, Wis.
Vapor Engineering Co., New York.
Webster & Co., Warren, Camden, N. J.

Water.
Grinnell Company, Providence, R. I.
Patterson-Kelley Co., New York.
Standard Heater Co., Williamsport, Pa.
Thrush & Co., H. A., Peru, Ind.

HUMIDIFIERS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., Milwaukee, Wis.
Carrier Air Conditioning Co., of America, Buffalo, N. Y.
Carrier Engineering Corporation, Newark, N. J
Drying Systems, Inc., Chicago, Ill.
Grinnell Company, Providence, R. I.
Massachusetts Blower Co., Watertown, Mass.
New York Blower Co., Chicago, Ill.
Seymour, James M., Newark, N. J.
Sturtevant Co., B. F., Hyde Park, Mass.

HUMIDITY CONTROL.
American Blower Co., Detroit, Mich.
Atlas Valve Co., Newark, N. J.
Bayley Mfg. Co., Milwaukee, Wis.
Carrier Air Conditioning Co., of America, Buffalo, N. Y.
Carrier Engineering Corp., Newark, N. J.
Drying Systems, Inc., Chicago, Ill.
Foxboro Co., Inc., The Foxboro, Mass.
Grinnell Company, Providence, R. I.
Massachusetts Blower Co., Watertown, Mass.
New York Blower Co., Chicago, Ill.
Powers Regulator Co., Chicago, Ill.
Sturtevant Co., B. F., Hyde Park, Mass.

INSTRUMENTS
Electric Measuring.
Bristol Co., Waterbury, Conn.
Westinghouse Electric & Mfg. Co., East Pittsburg, Pa.

Indicating and Recording.
American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Bristol Co., Waterbury, Conn.
Bailey Meter Co., Cleveland, O.
Foxboro Co., Inc., The Foxboro, Mass.

THE perfection of the Chicago Pump Company's Vertical Condensation Pump and Receiver is the answer to a problem that has, for many years, confronted the heating industry. This splendid outfit has been especially designed for duty where return lines from heating systems come back below the floor level.

Pitting a horizontal pumping unit (which has many obectionable features) or using makeshift outfits to meet these conditions is no longer necessary—the Vertical Condensation Pump may be installed *right in the ground.*

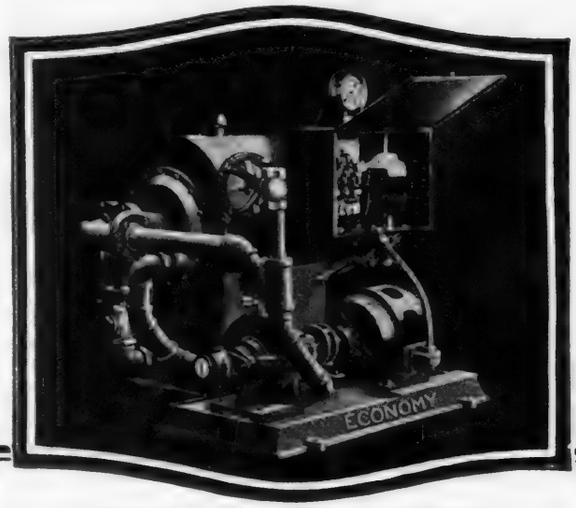
1. A very limited amount of floor space is required.
2. The outfit is self-contained and is shipped as a unit.
3. All flanges are machine finished and assembled to prevent steam leaks. Special oil-less bearings are used that will stand in hot water for several years without lubrication.
4. Our special improved float mechanism is guaranteed not to leak, or stick in stuffing boxes.

Units may be had for capacities up to 50,000 square feet of direct radiation and for boiler pressures up to 25 lbs. Bulletin 133 fully describes this splendid outfit.

Chicago Pump Company

Manufacturers of Quality Centrifugal Pumps for Every Service

2325 Wolfram St. Chicago, Ill.



Type C. V. Fig. 2234—Single Model Vacuum Pumps

DEPENDABILITY

This is an essential requirement of all apparatus entering into the equipment of every worth while project.

Economy Centrifugal Vacuum Pumps

embody every requisite of high class equipment. They are well motored with ample reserve power. They never burn out, consequently shut downs are avoided.

They have ample air, water and pressure capacity.

They have longer life than other types.

They maintain their efficiencies.

They are scientifically designed.

They have the best thought of competent hydraulic and heating engineers built into them.

They require less attention and upkeep than other types.

They reduce noise in radiators and piping.

They operate quietly.

They use no more power than other pumps that do the same work.

They are guaranteed for performance and quality.

Representatives in Every Large City

Economy Pumping Machinery Co.

71-122 North Curtis St. CHICAGO

ENGINEERS' SPECIFICATION INDEX (Continued)

Marsh & Co., Jas. P., Chicago, Ill.
Sarco Co., New York
Westinghouse Elec. & Mfg. Co., East Pittsburg, Pa

INSULATING MATERIALS.

American District Steam Co., No. Tonawanda, N. Y.
Armstrong Cork & Insulation Co., Pittsburgh, Pa.
Hornung, J. C., Chicago, Ill.
Johns-Manville, Inc., New York.
Pearce & Co., W. H., Chicago, Ill.
Ric-Wil Co., Cleveland, O.
Universal Gypsum Co., Chicago, Ill.
Wyckoff & Sons, A., Elmira, N. Y.

MANOMETERS.

American Schaeffer & Budenberg Corp., Brooklyn, N. Y.

MECHANICAL DRAFT APPARATUS.

American Blower Co., Detroit, Mich.
Buckeye Blower Co., Columbus, O.
Clarage Fan Co., Kalamazoo, Mich.
Massachusetts Blower Co., Watertown, Mass.
New York Blower Co., Chicago, Ill.
Sturtevant Co., B. F., Hyde Park Mass.
L. J. Wing Co., New York.

METERS.

Condensation.

American Dist. Steam Co., No. Tonawanda, N. Y.
Central Station Steam Co., Detroit, Mich.
Hornung, J. C., Chicago, Ill.
Pearce & Co., W. H., Chicago, Ill.

Feed Water.

Central Station Steam Co., Detroit, Mich.

Feed Water (Wier Type).

Webster & Co., Warren, Camden, N. J.

Flow

American District Steam Co., North Tonawanda, N. Y.
Spray Engineering Co., Boston, Mass.

Pitot Tube.

American Blower Co., Detroit, Mich.

Steam.

American District Steam Co., No. Tonawanda, N. Y.
Foxboro Co., Inc., The Foxboro, Mass.

MOTORS (Electric).

Sturtevant Co., B. F., Hyde Park, Mass.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

NIPPLE MACHINES.

Threading, Turning, Etc.

Bryant Sons & Co., O., Buffalo, N. Y.

NOZZLES, SPRAY

American Blower Co., Detroit, Mich.
Badger & Sons Co., E. B., Boston, Mass.
Bayley Manufacturing Co., Milwaukee, Wis.
Carrier Air Conditioning Co. of America, Buffalo, N. Y.
Carrier Engineering Co., Newark, N. J.
Clarage Fan Co., Kalamazoo, Mich.
New York Blower Co., Chicago, Ill.
Spray Engineering Co., Boston, Mass.
Sturtevant Co., B. F., Hyde Park, Mass.

OIL BURNERS

Aetna Automatic Burner Co., Providence, R. I.
American Nokol Co., Chicago, Ill.
Automatic Burner Corp., Chicago, Ill.
Combustion Fuel Oil Burner Co., Milwaukee, Wis.
Drying Systems, Inc., Chicago, Ill.
Hardinge Bros., Inc., Chicago, Ill.
Home Appliance Corp., St. Louis, Mo.
Ideal Rotary Burner Co., York, Pa.
Johnson Co., S. T., Oakland, Cal.
Marr Oil Heat Machine Cor., Minneapolis, Minn.
Rayfield Mfg. Co., Chicago, Ill.
Wilde Co., W. B., Peoria, Ill.
Winslow Boiler & Engineering Co., Chicago, Ill.

OZONE APPARATUS.

Air Conditioning & Engineering Co., St. Louis, Mo.
United States Ozone Co., Scottdale, Pa.

PIPE.

Cast Iron.

Clow & Sons, Jas. B., Chicago, Ill.

Steel.

National Tube Co., Pittsburgh, Pa.

Wood.

Wyckoff & Sons Co., A., Elmira, N. Y.

PIPE BENDING.

Badger & Sons Co., E. B., Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Grinnell Company, Providence, R. I.
National Pipe Bending Co., New Haven, Conn.
Whitlock Coil Pipe Co., Hartford, Conn.

PIPE CASING (Wood).

American District Steam Co., No. Tonawanda, N. Y.
Wyckoff & Sons Co., A., Elmira, N. Y.

PIPE HANGERS.

Grinnell Company, Providence, R. I.
Jenkins Bros., New York.

PIPE, POWER.

Grinnell Company, Providence, R. I.

PUMPS.

Centrifugal.

American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Chicago Pump Co., Chicago, Ill.
Economy Pumping Machinery Co., Chicago, Ill.
Nash Engineering Co., So. Norwalk, Conn.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Wheeler Condenser & Engineering Co., Carteret, N. J.
Yeomans Bros. Co., Chicago, Ill.
Young Pump Co., Michigan City, Ind.

Condensation.

American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Chicago Pump Co., Chicago, Ill.
Economy Pumping Machinery Co., Chicago, Ill.
Wright-Austin Co., Detroit, Mich.
Yeomans Bros. Co., Chicago, Ill.

Rotary.

Nash Engineering Co., So. Norwalk, Conn.

Steam.

American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
Nash Engineering Co., So. Norwalk, Conn.

Turbine.

Nash Engineering Co., So. Norwalk, Conn.
Wheeler Condenser & Engineering Co., Carteret, N. J.
Yoemans Bros., Chicago, Ill.

Vacuum.

American Steam Pump Co., Battle Creek, Mich.
Bishop & Babcock Co., Cleveland, Ohio.
Chicago Pump Co., Chicago, Ill.
Du Moin Pump Sales Co., Des Moines, Iowa.
Economy Pumping Machinery Co., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Nash Engineering Co., So. Norwalk, Conn.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Skidmore Corp., Chicago, Ill.
Trane Co., La Crosse, Wis.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Yeomans Bros., Chicago, Ill.
Young Pump Co., Michigan City, Ind.

RADIATOR HANGERS.

Frank Radiator Bracket Co., Chicago, Ill.
Gloeckle, Jr., A. F., Rochester, N. Y.
Grinnell Company, Providence, R. I.
Little Giant Mfg. Co., Minneapolis, Minn.
Hartmann Co., Charles, Brooklyn, N. Y.
Healy-Ruff Co., Minneapolis, Minn.
Pierce, Butler & Pierce Mfg. Co., New York.

RADIATOR MACHINERY.

Bryant Sons & Co., O., Buffalo, N. Y.

RADIATORS.

"Gasteam."

James B. Clow & Sons, Chicago, Ill.

"Gaswater."

Clow & Sons, Jas. B., Chicago, Ill.

RADIATORS, STEAM AND WATER.

Aerofin Corp., Newark, N. J.
American Radiator Co., Chicago, Ill.
International Heater Co., Utica, N. Y.
Gurney Heater Mfg. Co., Boston, Mass.
National Radiator Co., Johnstown, Pa.
Pierce, Butler & Pierce Mfg. Co., New York.
Richmond Radiator Co., New York
Standard Heater Co., Williamsport, Pa.
United States Radiator Corp., Detroit, Mich.

RECEIVERS.

Air.

American District Steam Co., No. Tonawanda, N. Y.
The Brownell Co., Dayton, Ohio.
Kieley & Mueller, Inc., New York.
Sterling Engineering Co., Milwaukee, Wis.

Condensation.

Chicago Pump Co., Chicago, Ill.
Davis Regulator Co., G. M., Chicago, Ill.
Economy Pumping Machinery Co., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Yeomans Bros., Chicago, Ill.

REGULATORS.

Boiler-Feed.

Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Chicago, Ill.

Damper.

American Dist. Steam Co., No. Tonawanda, N. Y.
Atlas Valve Co., Newark, N. J.
American Radiator Co., Chicago, Ill.
Bishop & Babcock Co., Cleveland, Ohio.
Davis Regulator Co., G. M., Chicago, Ill.
Fulton Co., Knoxville, Tenn.
Honeywell Heating Specialties Co., Wabash, Indiana.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
National Regulator Co., Chicago, Ill.
Nelson Corporation, Herman, Moline, Ill.
O-E Specialty Mfg. Co., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Simplex Heating Specialty Co., Inc., Lynchburgh, Va.
Sterling Engineering Co., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Trane Co., La Crosse, Wis.
L. J. Wing Mfg. Co., New York.

Pressure.

American District Steam Co., No. Tonawanda, N. Y.
Atlas Valve Co., Newark, N. J.
Davis Regulator Co., G. M., Chicago, Ill.
Foxboro Co., Inc., The Foxboro, Mass.
Fulton Co., Knoxville, Tenn.
Honeywell Heating Specialties Co., Wabash, Indiana.
Hornung, J. C., Chicago, Ill.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis Heat Regulator Co., Minneapolis, Minn.
National Regulator Co., Chicago, Ill.
Powers Regulator Co., Chicago, Ill.
Stickle Steam Specialties Co., Indiapapolis, Ind.
Thrush & Co., H. A., Peru, Ind.

Temperature.

American Radiator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bishop & Babcock Co., Cleveland, Ohio.
Carrier Engineering Corporation, Newark, N. J.
Foxboro Co., Inc., The Foxboro, Mass.
Fulton Co., Knoxville, Tenn.
Gold Car Heating & Lighting Co., Brooklyn,
Honeywell Heating Specialties Co., Wabash, Indiana.
Hornung, J. C., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis Heat Regulator Co., Minneapolis, Minn.
National Regulator Co., Chicago, Ill.
Powers Regulator Co., Chicago, Ill.
Sarco Co., New York.
White Mfg. Co., St. Paul, Minn.

SEPARATORS.

Oil.

Griscom-Russell Co., New York.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., New York.
Stickle Steam Specialties Co., Indianapolis, Ind.
Wright-Austin Co., Detroit, Mich.

Steam.

American District Steam Co., No. Tonawanda, N. Y.
Bishop & Babcock Co., Cleveland, Ohio.
Griscom-Russell Co., New York.
Illinois Engineering Co., Chicago, Ill
McAlear Mfg. Co., Chicago, Ill.
Patterson-Kelley Co., New York.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Webster & Co., Warren, Camden, N. J.
Wright-Austin Co., Detroit, Mich.

SPRAY COOLING SYSTEMS.

Badger & Sons Co., E. B., Boston, Mass.
Bayley Mfg. Co., Milwaukee, Wis.
Cooling Tower Co., New York.
Massachusetts Blower Co., Watertown, Mass
Seymour, James M., Newark, N. J.

SPRAY NOZZLES

(See Nozzles, Spray)

STOKERS

CombustiKator Co., Chicago, Ill.
Domestic Stoker Co., New York.

STRAINERS.

Oil.

Griscom-Russell Co., New York.
Kieley & Mueller, Inc., New York.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y

Steam.

American Dist. Steam Co., No. Tonawanda N. Y.
Dunham Co., C. A., Chicago, Ill.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., New York.
Mason Regular Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Sarco Co., New York.
Sterling Engineering Co, Milwaukee, Wis.
Wright-Austin Co., Detroit, Mich.

Water.

American Dist. Steam Co., No. Tonawanda, N. Y.
Davis Regulator Co., G. M., Chicago, Ill.
Griscom-Russell Co., New York.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Mason Regulator Co., Boston, Mass.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Sarco Co., New York.
Spray Engineering Co., Boston, Mass.

THERMOMETERS.

(Recording and Indicating).

American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Bristol Co., Waterbury, Conn.
Foxboro Co., Inc., The Foxboro, Mass.
Powers Regulator Co., Chicago, Ill.
Sarco Co., New York.

Water.

Marsh & Co., Jas. P., Chicago, Ill.
Pierce, Butler & Pierce Mfg. Co., New York.

THERMOSTATS.

American Radiator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bishop & Babcock Co., Cleveland, Ohio.
Fulton Co., Knoxville, Tenn.
Gold Car Heating & Lighting Co., Brooklyn,
Honeywell Heating Specialties Co., Wabash, Indiana.

YEOMANS

YEOMANS PUMPS • GIVE YEOMAN SERVICE •

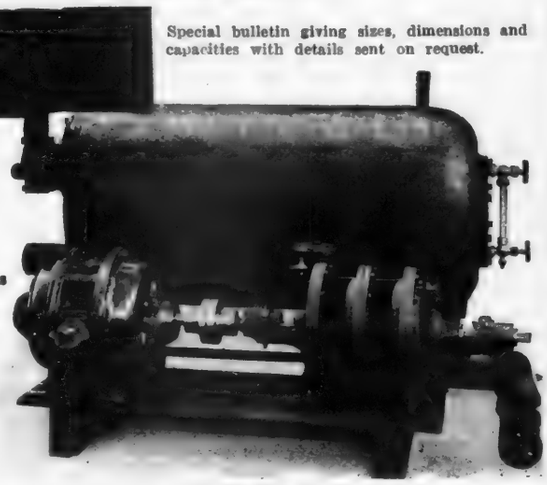
CONDENSATION PUMPS

AUTOMATIC
ELECTRIC
NOISELESS
RUGGED

The mark of Dependability

Built for all pressure and capacity requirements

Special bulletin giving sizes, dimensions and capacities with details sent on request.



Special Type H High Pressure Unit.

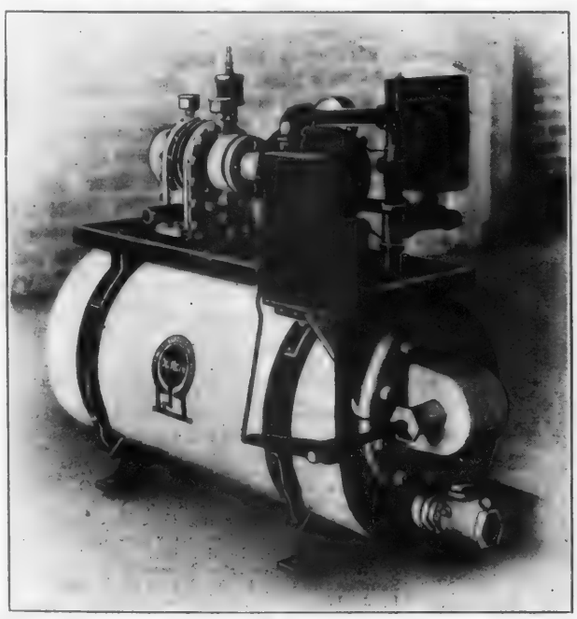
Also manufacturers of Bilge Pumps, Centrifugal Pumps, Sewage Ejectors, Sewage Pumps, etc.

YEOMANS BROTHERS CO.

1421 Dayton St. Representatives in all principal cities. Chicago, Ill.

DEPENDABILITY

THE DU MOIN VACUUM RETURN LINE PUMP



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SIMPLE EFFICIENT COMPACT
HIGH QUALITY MODERATELY PRICED

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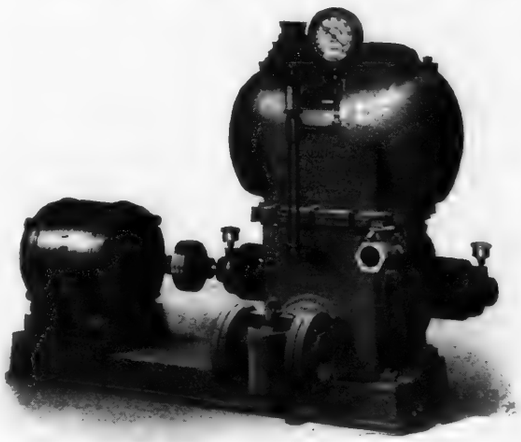
SKIDMORE



The New Type "B"

THE Skidmore Hydro Turbine Vacuum and Boiler Feed Pump is now entering its fifth year.

Units that have been in service four heating seasons show the same efficiency that was shown when installed.

The new type offered retains all the advantages of those now in service, the change in design being in the casing to secure a more compact and sturdy unit.

All parts are of high grade cast iron or bronze, accurately machined.

There are no close clearances on moving parts and no piping is required to set the unit.

A self-contained unit all on one base.

Built in seven sizes for 10 to 60 lbs. pressure to handle 5,000, 8,000, 16,000, 26,000, 40,000, 65,000 and 100,000 sq. ft. of radiation for continuous service or with automatic control

SKIDMORE CORPORATION

General Offices and Factory

1535 Dayton St. CHICAGO, U. S. A.

ENGINEERS' SPECIFICATION INDEX (Continued)

Johnson Service Co., Milwaukee, Wis.
Minneapolis Heat Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
Sarco Co., New York.
Thrush & Co., H. A., Peru, Ind.
White Mfg. Co., St. Paul, Minn.

TRAPS.

Radiator.

Barnes & Jones, Boston, Mass.
Bishop & Babcock Co., Cleveland, Ohio.
Cashin Co., W. D. Boston, Mass.
Dunham, C. A., Co., Chicago, Ill.
Hoffman Specialty Co., New York.
Ideal Heating Equipment Co., Cleveland, Ohio.
Illinois Engineering Co., Chicago, Ill.
Johns-Manville, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Marsh & Co., Jas. P., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mouat Vapor Heating Co., Cleveland, O.
Nelson Corporation, Herman, Moline, Ill.
O-E Specialty Co., Milwaukee, Wis.
Sarco Co., New York.
Sterling Engineering Co., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Trane Co., La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.

Return.

American Blower Co., Detroit, Mich.
Barnes & Jones, Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Illinois Engineering Co., Chicago Ill.
Johns-Manville, Inc., New York.
Kieley & Mueller, Inc., New York.
Marsh & Co., Jas. P., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Mouat Vapor Heating Co., Cleveland, O.
O-E Specialty Mfg. Co., Milwaukee, Wis.
Simplex Heating Specialty Co., Inc., Lynchburgh, Va.
Sterling Engineering Co., Milwaukee, Wis.
Trane Co., La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Wright-Austin Co., Detroit, Mich.

Steam.

American Blower Co., Detroit, Mich.
American District Steam Co., No. Tonawanda, N. Y.
American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Barnes & Jones, Boston, Mass.
Davis Engineering Co., New York.
Davis Regulator Co., G. M., Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Haines & Co., Wm. S., Philadelphia, Pa.
Hoffman Specialty Co., New York.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York.
Johns-Manville, Inc., New York.
Kieley & Mueller, Inc., New York.
Marsh & Co., Jas. P., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Patterson-Kelley Co., New York.
Pearce & Co., W. H., Chicago, Ill.
Sarco Co., New York.
Stickle Steam Specialties Co., Indianapolis, Ind.
Trane Co., La Crosse, Wis.
Wright-Austin Co., Detroit, Mich.

Vacuum.

American Blower Co., Detroit, Mich.
Bishop & Babcock Co., Cleveland, Ohio.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Hoffman Specialty Co., New York.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., New York.
Marsh & Co., Jas. P., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
O-E Specialty Mfg. Co., Milwaukee, Wis.
Pearce & Co., W. H., Chicago, Ill.
Sarco Co., New York.
Sterling Engineering Co., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Webster & Co., Warren, Camden, N. J.
Wright-Austin Co., Detroit, Mich.

TURBINES (Steam).

Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Hyde Park, Mass.
Westinghouse Elec. & Mfg. Co. East Pittsburgh, Pa.
L. J. Wing Mfg. Co., New York.

TURBO-BLOWERS.

Sturtevant Co., B. F., Hyde Park, Mass.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

UNDERGROUND PIPE CONDUITS.

American District Steam Co., No. Tonawanda, N. Y.
Hornung, P. C., Chicago, Ill.
Johns-Manville, Inc., New York
Pearce & Co., W. H., Chicago, Ill.
Ric-Wil Co., Cleveland, O.
Wyckoff & Son, A., Elmira, N. Y

VACUUM CLEANING APPARATUS.

American Radiator Co., Chicago, Ill.
Spencer Turbine Co., Hartford, Conn.
Sturtevant Co., B. F., Hyde Park, Mass.

VALVES.

Air (Automatic).

American Radiator Co., Chicago, Ill.
Commonwealth Brass Corporation, Detroit, Mich.
Fulton Co., Knoxville, Tenn.
Haines & Co., Wm. S., Philadelphia, Pa.
Hoffman Specialty Co., New York.
Jenkins Bros., New York.
Marsh & Co., Jas. P., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
O-E Specialty Mfg. Co., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Pierce, Butler & Pierce Corp., New York.

Air Relief.

American District Steam Co., No. Tonawanda, N. Y.
American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Barnes & Jones, Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Fulton Co., Knoxville, Tenn.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
O-E Specialty Co., Milwaukee, Wis.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Sterling Engineering Co., Milwaukee, Wis.
Webster & Co., Warren, Camden, N. J.

Back Pressure.

Griscom-Russell Co., New York.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Scott Valve Mfg. Co., Detroit, Mich.
Stickle Steam Specialties Co., Indianapolis, Ind.

Balanced.

American District Steam Co., No. Tonawanda, N. Y.
Atlas Valve Co., Newark, N. J.
Davis Regulator Co., G. M., Chicago, Ill.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Powers Regulator Co., Chicago, Ill.
Scott Valve Mfg. Co., Detroit, Mich.
Stickle Steam Specialties Co., Indianapolis, Ind.

Blow-off.

Jenkins Bros., New York.
The Wm. Powell Co., Cincinnati, O.

Check.

Grinnell Company, Providence, R. I.
Jenkins Bros., New York.
O-E Specialty Mfg. Co., Milwaukee, Wis.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.

Float.

American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Atlas Valve Co., Newark, N. J.
Davis Regulator Co., G. M., Chicago, Ill.
Grinnell Company, Providence, R. I.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller Co., New York.
McAlear Mfg. Co., Chicago, Ill.
Mason Regulator Co., Boston, Mass.
Stickle Steam Specialties Co., Indianapolis, Ind.

Gate.

American District Steam Co., No. Tonawanda, N. Y.
Grinnell Company, Providence, R. I.
Jenkins Bros., New York.
Marsh Valve Co., Erie, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.

Globe, Angle and Cross.

Commonwealth Brass Corp., Detroit, Mich.
Grinnell Company, Providence, R. I.
Jenkins Bros., New York.
Marsh Valve Co., Erie, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Pierce, Butler & Pierce Corp., New York.
Powell Co., Wm., Cincinnati, O.
Powers Regulator Co., Chicago, Ill.
Scott Valve Mfg. Co., Detroit, Mich.

Hydraulic-Operating.

Atlas Valve Co., Newark, N. J.
Kieley & Mueller, Inc., New York.

Non-Return.

American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Davis Regulator Co., G. M., Chicago, Ill.
Grinnell Company, Providence, R. I.
Jenkins Bros., New York.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

Radiator.

American Radiator Co., Chicago, Ill.
American District Steam Co., No. Tonawanda, N. Y.
Atlas Valve Co., Newark, N. J.
Barnes & Jones, Boston, Mass.
Bishop & Babcock Co., Cleveland, Ohio.
Commonwealth Brass Corporation, Detroit, Mich.
Dunham Co., C. A., Chicago, Ill.
Fulton Co., Knoxville, Tenn.
Gorton & Lidgerwood Co., New York.
Honeywell Heating Specialties Co., Wabash, Indiana.
Ideal Heating Equip. Co., Cleveland, Ohio.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York.
McAlear Mfg. Co., Chicago, Ill.
Marsh & Co., Jas. P., Chicago, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Powell Co., Wm., Cincinnati, O.
Powers Regulator Co., Chicago, Ill.
Trane Co., La Crosse, Wis.
Scott Valve Mfg. Co., Detroit, Mich.
Simplex Heating Specialty Co., Inc., Lynchburg, Pa.
Sterling Engineering Co., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Webster & Co., Warren, Camden, N. J.

Reducing.

American District Steam Co., No. Tonawanda, N. Y.
Atlas Valve Co., Newark, N. J.
Davis Regulator Co., G. M., Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York.
Johnson Service Co., Milwaukee, Wis.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Mason Regulator Co., Boston, Mass.
Powell Co., Wm., Cincinnati, O.
Powers Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.

Regulating.

American District Steam Co., No. Tonawanda, N. Y.
Fulton Co., Knoxville, Tenn.
Hornung, J. C., Chicago, Ill.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York.
Kieley & Mueller, Inc., New York.
McAlear Mfg. Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
Powers Regulator Co., Chicago, Ill.

Relief (Water).

American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, Ohio.

Safety.

American District Steam Co., No. Tonawanda, N. Y.
American Schaeffer & Budenberg Corp., Brooklyn, N. Y.
Jenkins Bros., New York.
Powell Co., Wm., Cincinnati, O.

Stop and Check.

(See Valves, Non Return).

VENTILATING HEATERS

Portable Unit.

American Blower Co., Detroit, Mich.
Buckeye Blower Co., Columbus, Ohio.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nelson Corporation, Herman, Moline, Ill.
Nesbitt, John J., Inc., Atlantic City, N. J.
Pecco, Inc., St. Louis, Mo.
Peerless Unit Ventilating Co., New York.
Stickle Steam Specialties Co., Indianapolis, Ind.
Sturtevant Co., B. F., Hyde Park, Mass.
York Heating & Ventilating Co., Philadelphia, Pa

(See also Heaters, Portable Unit Air).

VENTILATING SYSTEMS

Air Conditioning & Engineering Co., St. Louis, Mo.
American Blower Co., Detroit, Mich.
Autovent Fan & Blower Co., Chicago, Ill.
Bayley Mfg. Co., Milwaukee, Wis.
Buckeye Blower Co., Columbus, O.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Engineering Corporation, Newark, N. J
Clarage Fan Co., Kalamazoo, Mich.
Ilg Electric Ventilating Co., Chicago, Ill.
Massachusetts Blower Co., Watertown, Mass
Nelson Corporation, Herman, Moline, Ill.
Nesbitt, John J., Inc., Atlantic City, N. J.
New York Blower Co., Chicago, Ill.
Pecco, Inc., St. Louis, Mo.
Peerless Unit Ventilating Co., New York.
Seymour, James M., Newark, N. J.
Skinner Bros. Mfg. Co., St. Louis Mo.
Sturtevant Co., B. F., Hyde Park, Mass.
L. J. Wing Mfg Co., New York.
York Heating & Ventilating Co., Philadelphia, Pa

VENTILATORS.

Aeolus Dickinson Co., Chicago, Ill.
Bayley Mfg. Co., Milwaukee, Wis.
Buckeye Blower Co., Columbus, O.
Buffalo Forge Co., Buffalo, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
New York Blower Co., Chicago, Ill.
Pecco, Inc., St. Louis, Mo.
Seymour, James M., Newark, N. J.
Sturtevant Co., B. F., Hyde Park, Mass.
L. J. Wing Mfg. Co., New York.
York Heating & Ventilating Co., Philadelphia, Pa

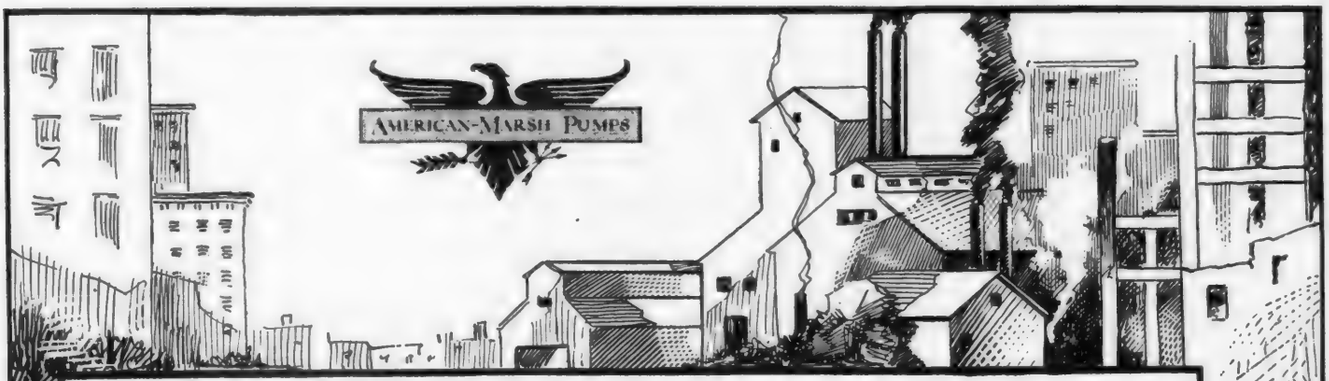
Mushroom.

Aeolus Dickinson Co., Chicago, Ill.
Knowles Mushroom Ventilator Co., New York
New York Blower Co., Chicago, Ill.
Sturtevant Co., B. F., Hyde Park, Mass.

WEATHER STRIPS.

Metal.

Athey Company, Chicago, Ill.
Chamberlin Metal Weather Strip Co., Detroit, Mich.
Higgin Manufacturing Co., Newport, Ky.



American-Marsh Condensation Pumps

for Heating Systems

The centrifugal automatic Boiler Feed Pump and receiver, motor driven, is the ideal pump for low pressure heating systems where the condensation flows by gravity into the receiving tank. Made in both vertical and horizontal types for boiler pressure up to fifty pounds. All American-Marsh pumps give the highest type of service. We recommend the installation that suits your requirements.

WRITE FOR BULLETINS

American Steam Pump Company
Battle Creek, Michigan

The Line Includes

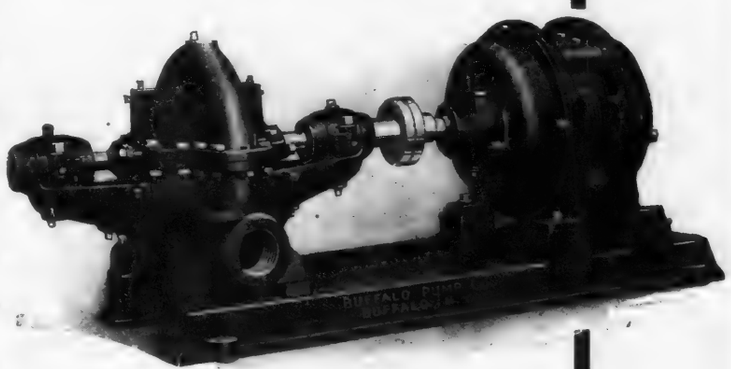
Vacuum Pumps, Hot Water Circulating Pumps, Sump or Bilge Pumps, Automatic Boiler Feed Pumps, Condensation Pumps, Boiler Feed Pumps.

If your pumps have all these features, they're "Buffalo"

If you are using pumps that have all the features listed below—they're probably "Buffalo."

1. **Casing:** Horizontally divided; mounted directly on base. Interior can be inspected without breaking pipe connections.
2. **Impeller:** Enclosed double suction type, hydraulically balanced.
3. **Clearance Rings:** Brass. Furnished in casing. Easily renewable.
4. **Shaft Bearings:** Ring oiling, horizontally split housings. Brackets bolted to casing, one on each side.
5. **Thrust Bearings:** Collars in each bearing of smaller pumps, marine type on larger sizes.
6. **Stuffing Boxes:** Extra deep. Brass bushed in smaller sizes.
7. **Glands:** Bolted type.
8. **Water Seals:** Brass. Furnished in each stuffing box. Connections cast in casing in smaller sizes.

If you're not using them, right now it is a good time to get all the reasons for the popularity of Buffalo Pumps.



This is the Buffalo Class "S" Pump described at the left. Users say that they save money with this pump.

Buffalo Steam Pump Company

480 BROADWAY **BUFFALO, N. Y.**

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Like leaders in other industries, most of the great newspaper plants of the country are equipped with Patterson Hot Water Heaters. In New York City alone Patterson Heaters are used by publishers of the Times, World, News and Herald-Tribune—every newspaper in the city with a daily circulation of over 275,000 save one.
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RELIEF VALVE
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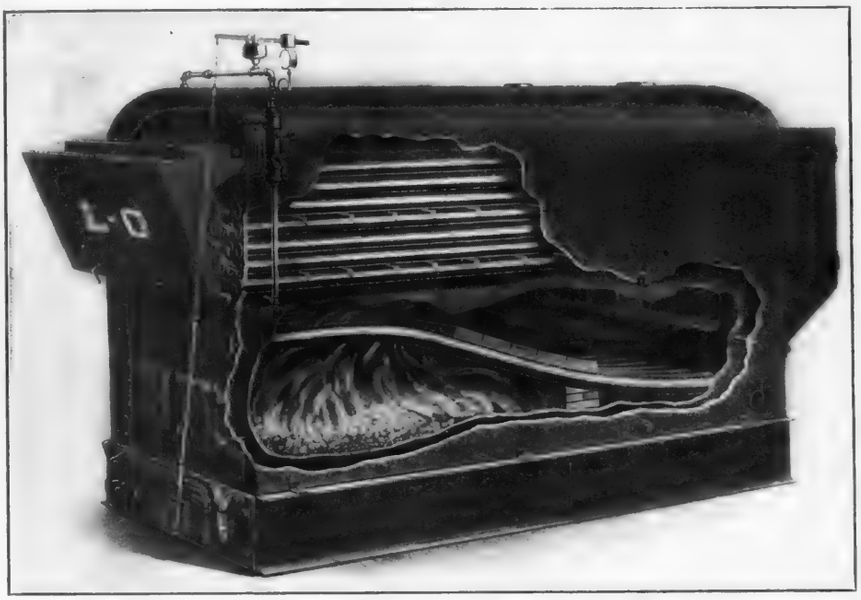
BLOW OFF
COLD WATER INLET
AIR VALVE TAPPING
The Patterson-Kelley Co.
107 East 40th St., New York City

LEBANON L-O BOILERS



ABREAST OF THE TIMES

The L-O Boiler embodies all of the improved features that have enabled boilers of locomotives to greatly increase their capacity—*and keep abreast of the times.*

LEBANON BOILER WORKS

J. K. PETTY & CO., Inc., Proprietors

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(15th & Market Sts.)

Main Office and Works
1244 Buttonwood Street
LEBANON, PA.

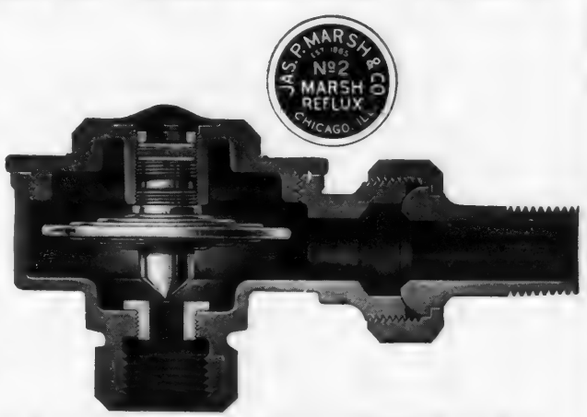
Koithan & Pryor, Representatives
39 Cortlandt St., NEW YORK CITY

Representatives in Principal Cities

MARSH REFLUX THERMOSTATIC RADIATOR TRAPS

GUARANTEE ON EVERY TRAP

If any Marsh Reflux Trap might develop a defect in material, workmanship or operation inside of five years after date of installation, such Trap would be replaced free of charge.



The Most Economical, Practical and Efficient Trap for the Average Sized Unit

Marsh Reflux Traps assure full efficiency of Radiator Coil and System.

Automatically discharge air and the water of condensation as fast as it is formed.

The Trap closes the instant steam or vapor strikes the thermostatic diaphragm. Vapor or steam cannot pass through the Trap; therefore every atom of heat is given off in the radiator or coil.

Just one movable part—nothing loose to rattle, chatter or make a noise.

Neat in appearance, handsomely finished and heavily nickel-plated.

The Economical, Practical and Efficient Trap for Both Small and Large Units

Marsh Reflux Traps are all-metal construction including heavy cast brass body, handsomely nickel-plated and with extra heavy special tail piece.

The one movable part—a genuine phosphor bronze non-collapsible Thermostatic Diaphragm—contains the combination of volatile fluids so balanced as to, at all times, distinguish between air and water of condensation and vapor or steam. So corrugated and constructed to eliminate the slightest possibility of rupture from alternate expansion and contraction.

JAS P. MARSH & CO.

114-124 So. Clinton St.
ESTABLISHED 1865
Chicago

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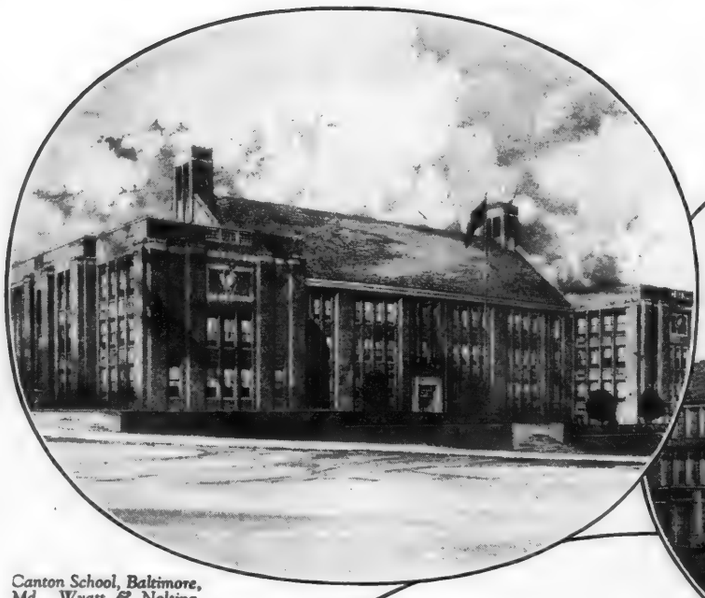
Agents for Dominion of Canada: Taylor-Forbes Co., Ltd., Guelph, Ontario.



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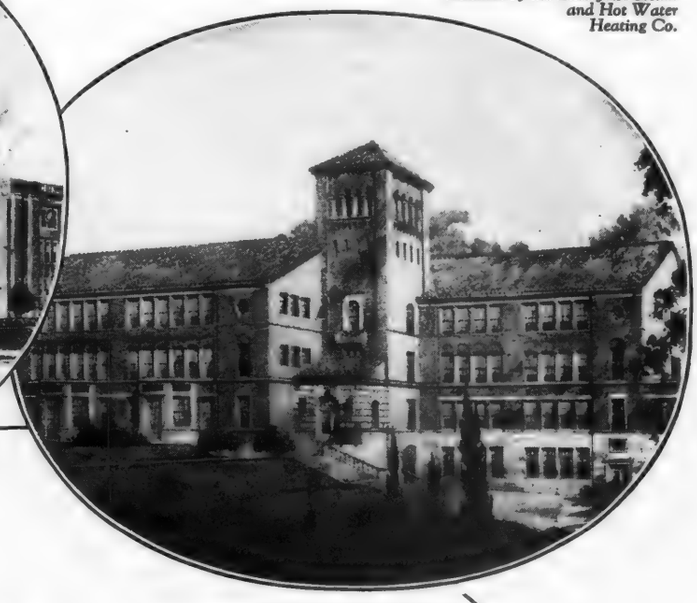

Roland Park School, Baltimore, Md. Edw. L. Palmer, Architect, H. G. Perring, Supervising Engr., Chas. L. Reeder, Consulting Engr. Three 15,000' Pacific Boilers installed by the Enterprise Steam and Hot Water Heating Co.

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In Baltimore the moderate and changeable climate creates special conditions which influence heating. Efficiency must be maintained when operating both below and above rated capacity. Quick steaming and flexible fire control are necessary to keep buildings comfortable without wasting fuel.

Pacific Steel Boilers meet these conditions in Baltimore schools for the same reason they have met the conditions of other climates from coast to coast—because Pacific design is fundamentally sound. Direct heating surface is greater than in any other type low pressure steel heating boiler. Combustion space is greater and fire travel longer, insuring maximum combustion.

Pacific Boilers are better boilers for heating all types of buildings. Let us send you data on the type in which you are interested.

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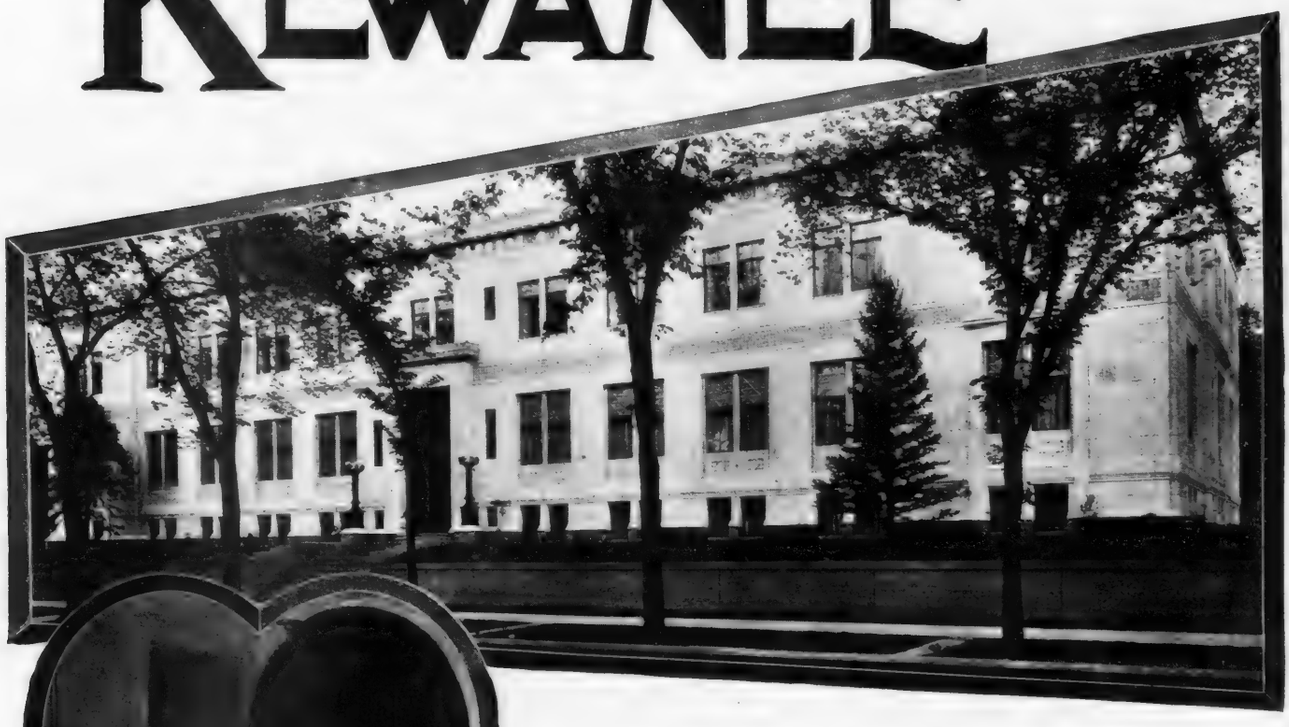
Branch Offices in Principal Cities

PACIFIC

STEEL HEATING BOILERS

KEWANEE



The Capitol Life Insurance Company
CLARENCE J. DALY, PRESIDENT
Denver, Colorado

Capitol Life Insurance Building heated by one No. 13 Type "K" Kewanee Firebox Boiler with Kewanee Radiation.

—

Hot water furnished by No. 25 Tabasco Heater with Extra Heavy Kewanee Tank, all installed by Johnson & Davis Plumbing and Heating Company, Denver.

—

H. J. Manning, Architect, Denver

Strong Heart takes adventure from heating. The Kewanee Boiler is the sound heart that warms thousands of finer buildings like this bright jewel of the West.

KEWANEE BOILER COMPANY

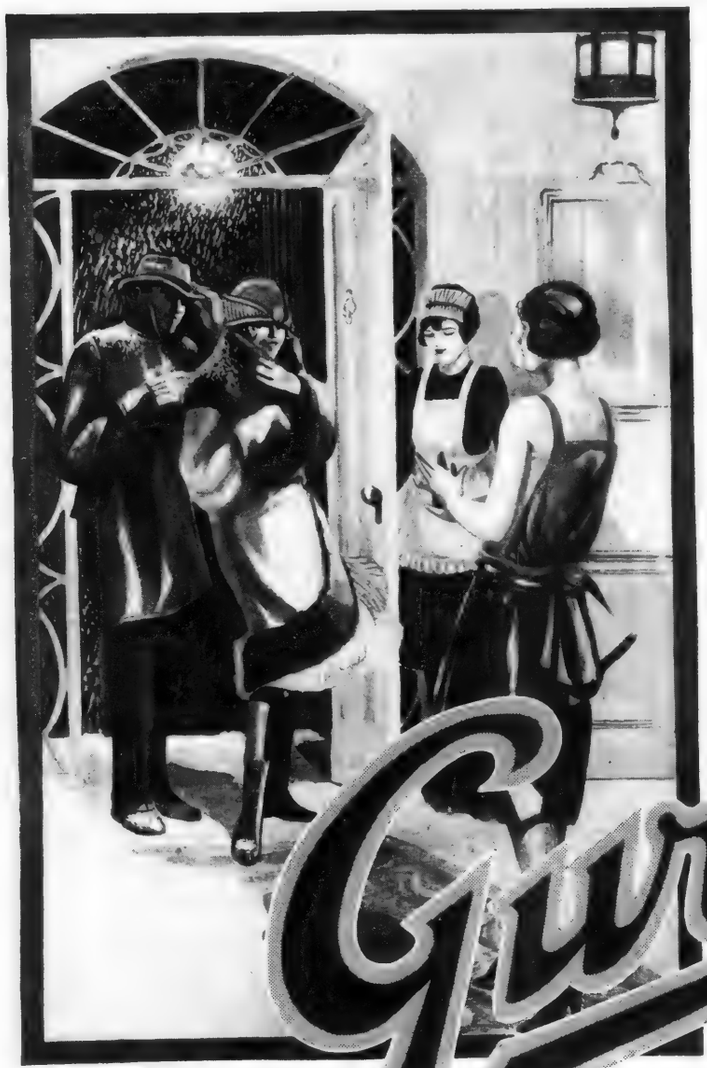
KEWANEE, ILLINOIS

Steel Heating Boilers, Radiators, Water Heaters, Tanks and Water Heating Garbage Burners

— BRANCHES —

ATLANTA	1522 Candler Building	DETROIT	2051 West LaFayette Boulevard	NEW YORK CITY	47 W. 42nd Street
BIRMINGHAM	2233 Arlington Ave.	EL PASO	226 Mesa Avenue	PEORIA	103 Farmington Road
BOSTON	1140 Little Bldg., 90 Boylston St.	GRAND RAPIDS	402½ Michigan Trust Bldg.	PHILADELPHIA	510 Real Estate Trust Bldg.
CHARLOTTE, N. C.	1016 Johnston Building	INDIANAPOLIS	221 Indiana Term. Warehouse	PITTSBURGH	Empire Building
CHATTANOOGA	1203 James Building	KANSAS CITY	2014 Wyandotte Street	ST. LOUIS	4200 Forest Park Boulevard
CHICAGO	822 W. Washington Boulevard	LITTLE ROCK	313-15 E. Markham St.	SALT LAKE CITY	204 Dooly Building
CINCINNATI	P. O. Box 75	LOS ANGELES	306 Crocker Street	SAN ANTONIO	502 Calcasieu Building
CLEVELAND	Superior Ave., N. E. at 17th St.	MEMPHIS	1812 Exchange Building	SAN FRANCISCO	635 Mission Street
DALLAS	1903-4 Santa Fe Building	MILWAUKEE	440 Barclay Street	SEATTLE	326 Columbia Street
DENVER	1226-1228 California Street	MINNEAPOLIS	708 Builders Exchange Bldg.	TOLEDO	1121-1122 Nicholas Building
DES MOINES	707 Hubbell Building	NEW ORLEANS	1018 New Orleans Bank Bldg.		

DOMINION KEWANEE BOILER CO., LTD., 66 Richmond Street, East, TORONTO 2, ONT.



Welcome Warmth

ESSEX

STEAM and WATER

—large steam space

—quick thorough circulation of water

—simple arrangement of fire

—roomy ashpits

—efficient triangular pattern grates

—simplicity, durability and economy nicely combined

Gurney

Important as the House Itself

Every season brings a lively demand for better heaters. Right in your field ton after ton of coal is being wasted in obsolete heaters.

In Gurney you have the opportunity of building a fine reputation, right away, too. You can bring comfort at a saving to many.

This heating proposition merits your consideration. Why not get in touch with us for full information on all types—the Lenox and 900 Series cover every heating requirement—residence, garage, church, etc.

GURNEY HEATER M'F'G COMPANY

GENERAL OFFICES, BOSTON, MASS.

93-97 OLIVER STREET, FORT HILL SQUARE

GURNEY HEATER CO., INC.
NEW YORK
MANLY ST. COR. ANABLE AVE
LONG ISLAND CITY

GURNEY HEATER M'F'G CO.
RICHMOND, VA.
418 EAST MAIN STREET

GURNEY HEATER CO., INC.
PHILADELPHIA
108 NORTH 17TH ST.

This is a photograph of a No. 19 Essex Steam Boiler

WANTED
Sales Representatives

If you are a well rated concern, or a financially responsible individual, and can sell to building owners, heating contractors and architects, an opportunity is open to you as a district representative for WOLFF DRAFT CONDITIONERS—***the fuel saving device that has "made good" in practically every instance.***

Wolff Draft
Conditioners

There's no question about Wolff Draft Conditioners saving fuel. In Chicago alone there are more than 5000 fine buildings equipped with them. Practically every one of these owners says they do everything we claim for them.

It doesn't make any difference how fine a boiler a building has. *If the draft isn't properly conditioned it can't operate at its best efficiency.*

Wolff Draft Conditioners keep a boiler doing its best work, without the use of skilled labor, or any great use of time.

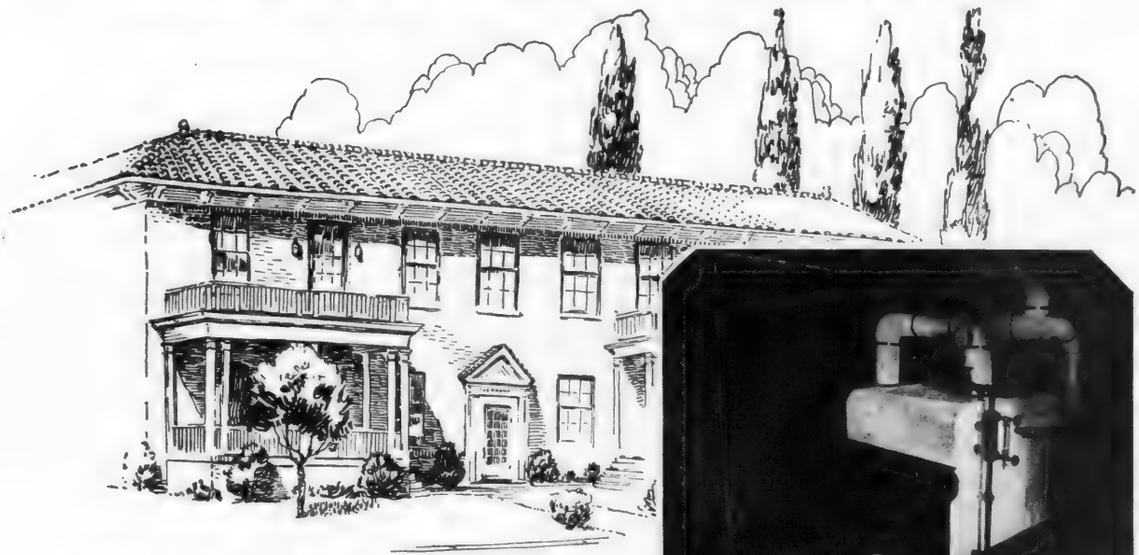
That's why they are *used and endorsed* by leading boiler makers, architects, heating engineers, as well as building owners.

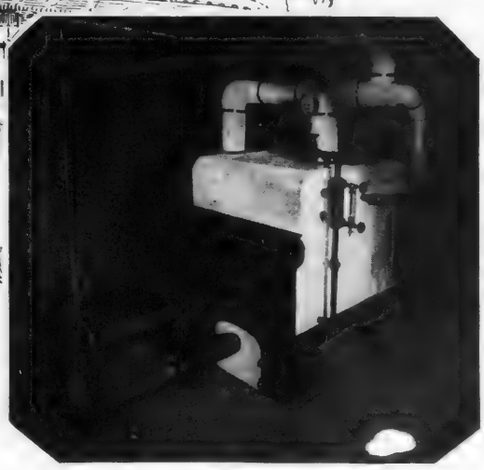
We can prove all this to you. May we?

Wolff Coal Saver Co.

1336 West Congress St. **Chicago**

Continental
BOILERS & RADIATORS





Brantley Apartments, Goldsboro, N. C.
Equipped with a Continental
Low Water Line Boiler
Installed by
W. O. Mitcham, Goldsboro, N. C.
Noland Co., Distributors
Raleigh and Winston-Salem, N. C.
Newport News—Roanoke, Va.

Better Heating in Goldsboro, N. C. with
Continental Low Water Line Boilers

APARTMENT-heating is an exacting business; exacting tenants make it so. The Brantley Apartments at Goldsboro is one of the many installations in the South equipped with Continental Low Water Line Boilers. Here are some of the reasons why Continental Boilers and Radiators are built for better heating:

1 With low 43 and 47 inch Water Lines they are easily installed in shallow basements.

2 Low Water Line design eliminates refuse-gathering pits.

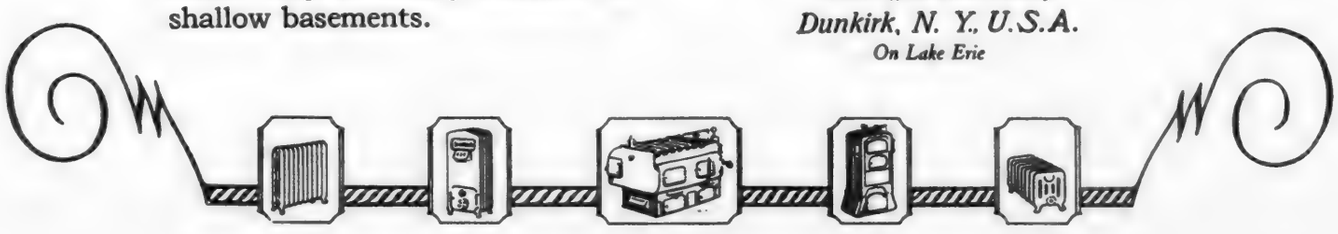
3 Grate bars running the short way of the boiler make them easy to fire.

4 They are quick steamers.

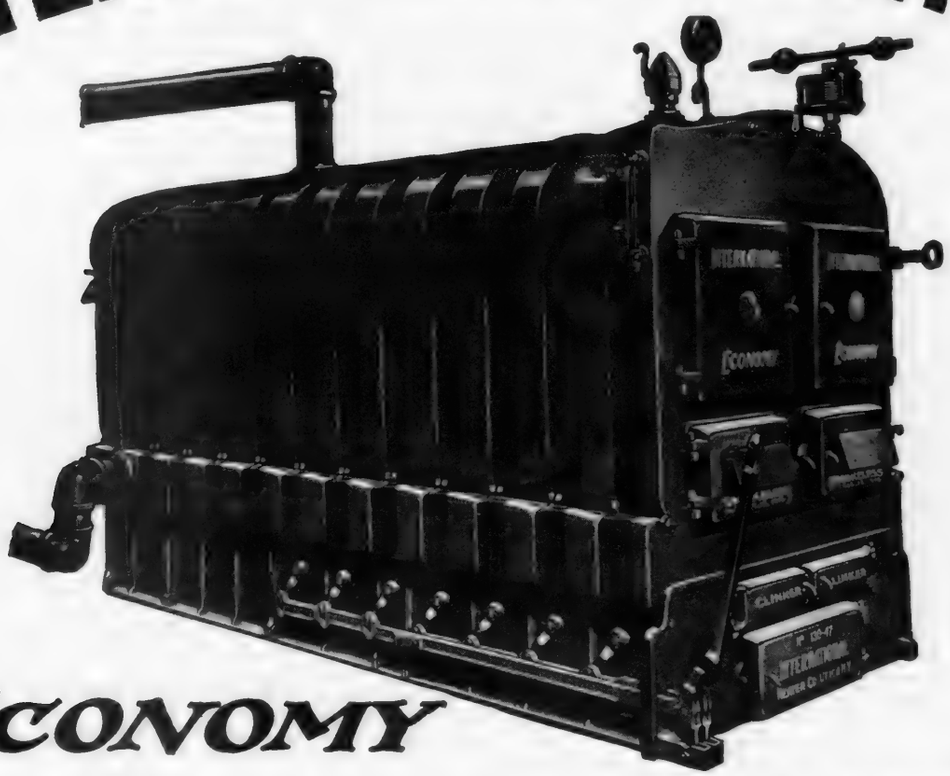
5 They use any kind of fuel, and are well adapted to oil-burning.

Continental Boilers and Radiators are built for better heating. You'll enjoy doing business with Continental.

Continental Heater Corporation
Home Office and Factory
Dunkirk, N. Y. U.S.A.
On Lake Erie



INTERNATIONAL HEATERS



ECONOMY SMOKELESS BOILERS

TEMPERATURE—MIXTURE—TIME! Two combustion chambers in which the gases are raised to a high temperature, mixed with air in the proper proportion, and *held* until they are consumed, prevent these smoky gases from going up the chimney, and help develop every possible pound of steam from every pound of coal.

That's why it is *smokeless*—and one reason why it is "*Economy*."

Among the 20 additional features of the International Economy Smokeless Boiler are these:

No header required—yet it gives *dry* steam,

Accurate air control—saving fuel,

Sufficient coal capacity—to develop full capacity for long periods and allow for rekindling,

No soot pockets—flues easily cleaned from front,

Very conservatively rated,

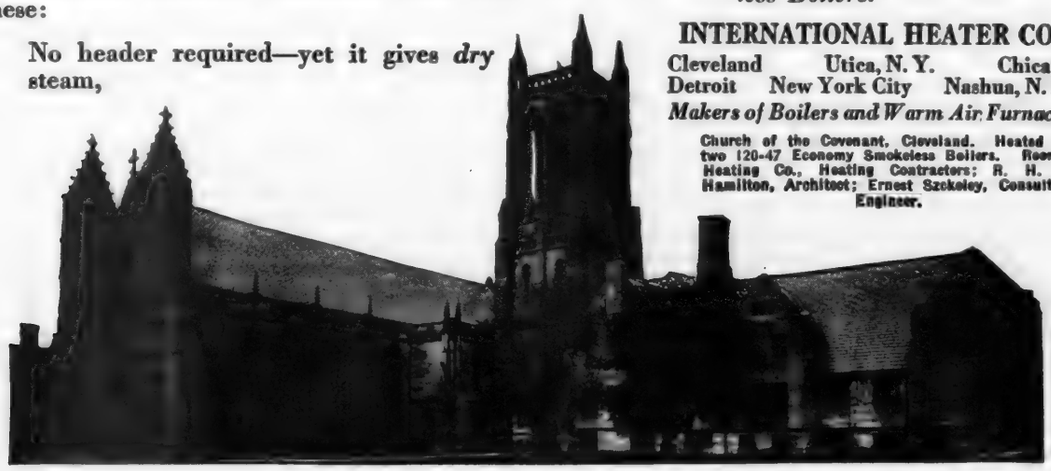
Backed by 85 years of heater experience.

Dealers and heating engineers are invited to send for catalog 1751-H which gives detailed specifications on International Economy Smokeless Boilers.

INTERNATIONAL HEATER CO.

Cleveland Utica, N. Y. Chicago
Detroit New York City Nashua, N. H.

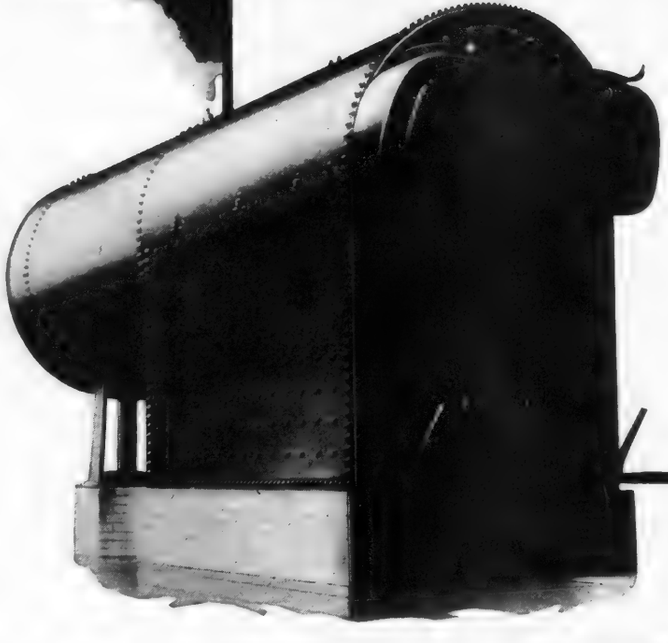
Makers of Boilers and Warm Air Furnaces



Church of the Covenant, Cleveland. Heated by two 120-47 Economy Smokeless Boilers. Roemer Heating Co., Heating Contractors; R. H. P. Hamilton, Architect; Ernest Szekely, Consulting Engineer.

In the Ruskin Apartments,
Pittsburgh, Pa.

TITUSVILLE ~ TICO SMOKELESS BOILERS



The Ruskin apartments—one of the ultra modern apartment hotels that is meeting with remarkable success not only in Pittsburgh, but in other cities throughout the country—and in which Tico Smokeless Boilers are proving most satisfactory for heating purposes.

Write for our Catalogue No. 85

TITUSVILLE IRON WORKS CO.
TITUSVILLE, PENNA.

Sales Offices:

New York, N. Y. 152 West 42nd Street
Pittsburgh, Pa. Farmers Bank Bldg.
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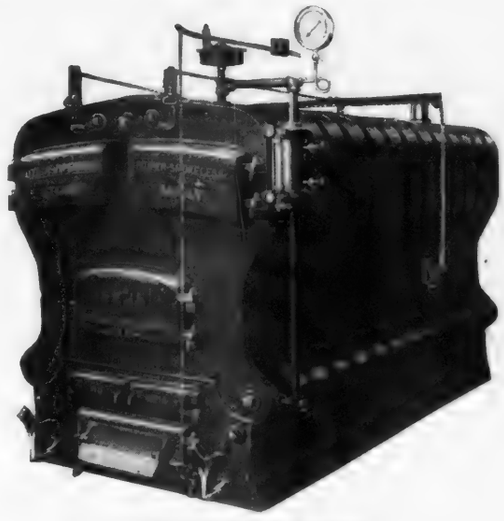
TEMPLE OF SCOTTISH RITE, NASHVILLE, TENN.

Asmus & Clark, *Architects* Gowans-Hailey Co., *Heating Contractors*

Insured Against the Heat Thief—SMOKE!



Exterior View of Boiler

IT has been estimated that nearly $50,000,000 is wasted each year in the form of smoke. Smoke is composed largely of carbon and is rich in heat value. Allowing it to escape unused up the chimney means a serious waste of fuel.

Utica Imperial SUPER-SMOKELESS Boilers burn smoke and soot within the boiler as fuel of remarkable heating value. Since the introduction of this remarkable boiler, owners have been saved many thousands of tons of coal. All of the heat units in the fuel are utilized, the smoking stack is eliminated, and every ton of coal burned gives out a greatly increased amount of heat.

UTICA—IMPERIAL

SUPER-SMOKELESS BOILERS

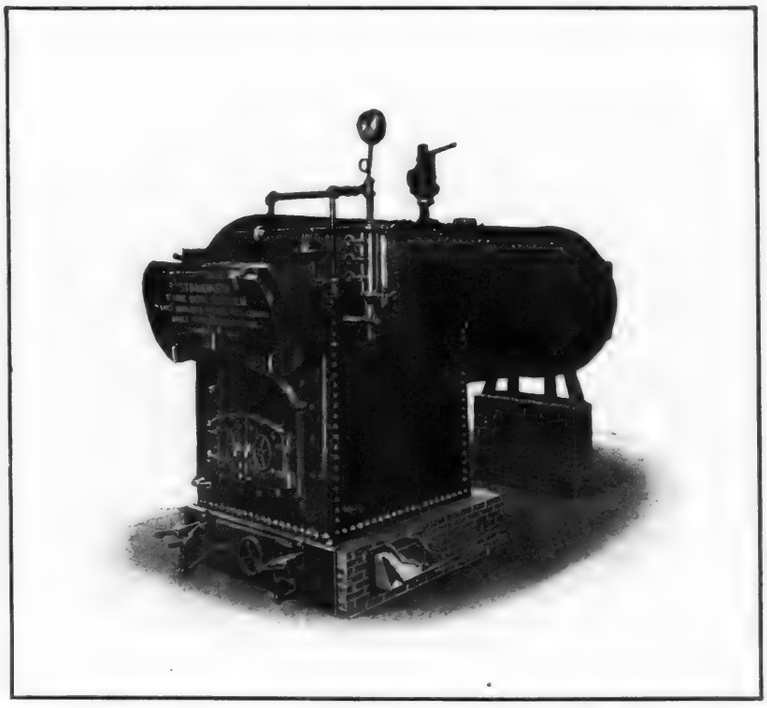
Manufactured by the

UTICA HEATER COMPANY, UTICA, N. Y.

"PIONEERS IN SMOKELESS COMBUSTION"

Sales Offices in the Principal Cities

AMES



FIREBOX HEATING BOILERS

AMES IRON WORKS

Division of

PIERCE, BUTLER & PIERCE

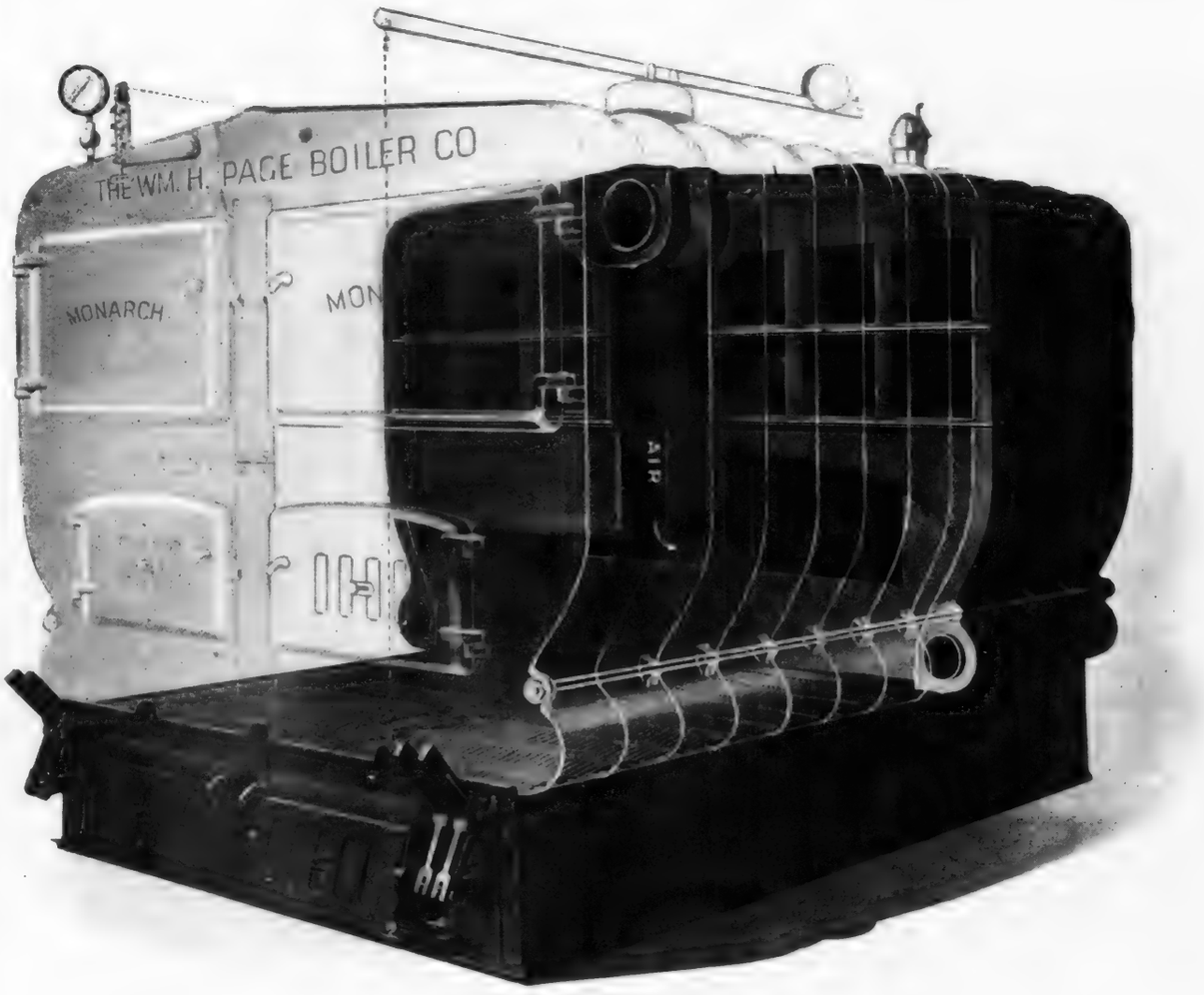
MANUFACTURING CORPORATION

Main Office and Works

OSWEGO, N. Y.

General Sales Offices

41 EAST 42nd STREET, NEW YORK CITY

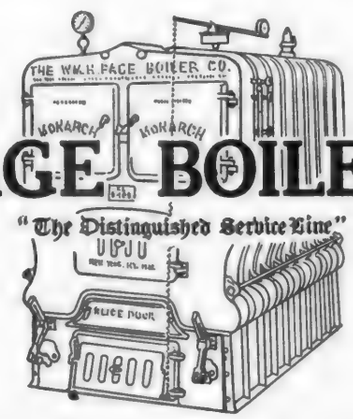


Monarch 60″ Smokeless Boilers burn soft coal, without smoke.

Smoke is wasted fuel. With, or without, the auxiliary air inductor, Monarch boilers develop high efficiency when the fuel used is hard coal, coke or oil.

Capacity up to 29,000 sq. ft., steam. 60 inch grate. 60″ water line. Long fire travel, on three levels. Monarch boilers are efficient under all working conditions, burning any available fuel —and will fit into cramped boiler room spaces.

Send for catalogue No. 52.



PAGE BOILERS

THE WM. H. PAGE BOILER CO.

200 Madison Avenue

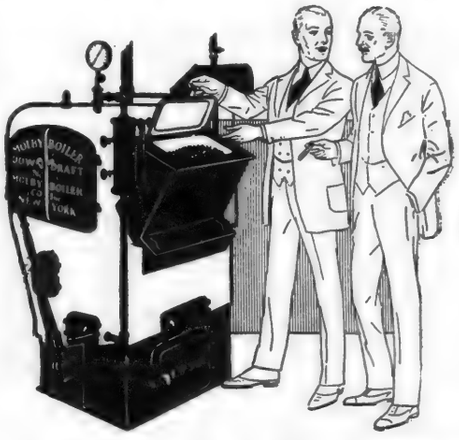
NEW YORK

BOSTON **CLEVELAND**
PHILADELPHIA **MEADVILLE**

Established 1856 **Incorporated 1876**

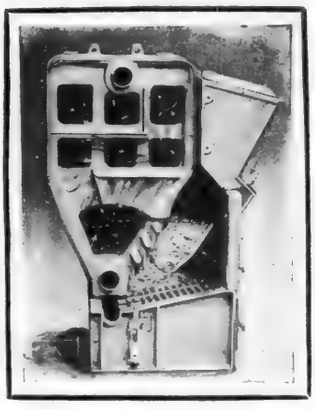
Low Pressure Heat *with* No. 1 Buckwheat

for homes and large buildings



—no blower
—no motor
—no electricity

No machinery to get out of order



THE adjustable side grate of the Molby down-draft-crossdraft boiler assures highest efficiency with No. 1 Buckwheat Anthracite without mixing with domestic coal.

The magazine which feeds the coal down into the fire by gravity needs filling only every 12 to 14 hours in severe winter weather.

Hundreds of Molby boilers and tank heaters are cutting coal bills as much as 50% in mansions, homes, apartment houses, churches, institutions and other buildings.

Steam and vapor, 500 to 7750 sq. ft. Hot water, 850 to 12925 sq. ft. Ask for catalog of Molby Boilers and Lansdale Radiators.

The **MOLBY**

HEATING BOILER

burns No. 1 Buckwheat

(MAGAZINE-FEED)

MOLBY BOILER COMPANY

Subsidiary of

The Universal Pipe and Radiator Company

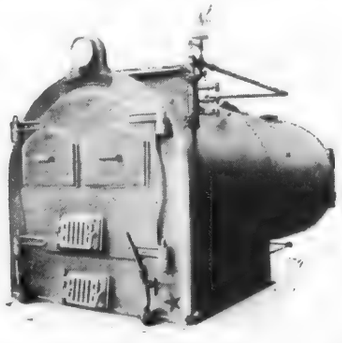
NEW YORK: 41 East 42nd Street

LANSDALE, PA.: 41 Central Avenue

Place no boiler order until you have asked yourself the following 12 questions

Stanwood answers follow each question.

1. **Can installation be made quickly?**
   A. Stanwood boilers can be installed in 3 to 4 days time.
2. **Have I enough room?**
   A. Stanwood boilers require but little space for installation.
3. **Is water line low, that excavating costs may be minimized?**
   A. 45 to 77 inches in Stanwood boilers.
4. **Will masonry expense be high?**
   A. No outside brickwork with Stanwood boilers. Minimum standard inside.
5. **What will assure me that fuel will burn economically?**
   A. Down draft furnace in Stanwood boilers assures perfect combustion.
6. **What losses must I expect due to air leaks?**
   A. None in Stanwood boilers. Steel shell is air tight.
7. **Must radiation losses be expected as a matter of course?**
   A. Not in Stanwood boilers. Radiation losses are very slight.
8. **Will I enjoy the economy of a quick steaming boiler?**
   A. Stanwood boilers are very quick steamers.
9. **Have I checked stack temperature as an indication of efficiency?**
   A. Stanwood stack temperatures are low, indicating efficient fuel combustion.
10. **Will I run afoul of the local smoke ordinance?**
    A. Stanwood boilers are smokeless.
11. **How will my local water affect the inside of my boiler?**
    A. In Stanwood boilers there are no staybolts to corrode and no mudlegs to foul. Rapid water circulation is a feature of this economically operated and maintained boiler.
12. **How long must I shut down for cleaning?**
    A. Just a few hours in Stanwood boilers. Front opens like a door. Immediately and completely accessible.



STANWOOD

Smokeless BOILERS

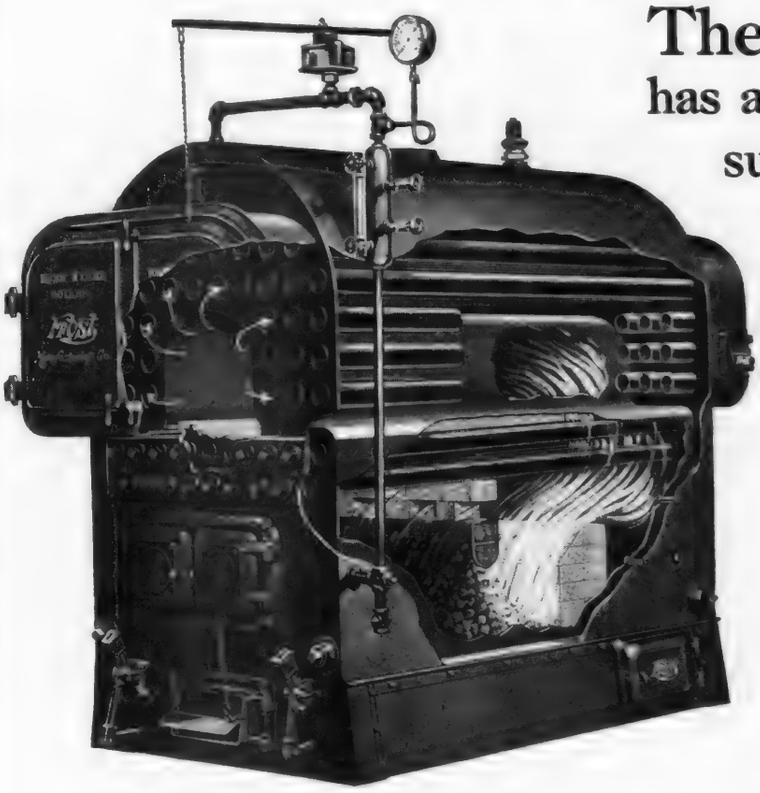
Working pressures 15 to 200 lbs.
Sizes 29 to 210 H. P.

Stanwood Smokeless Boilers answer satisfactorily these and any other questions inquiring boiler purchasers may make in seeking utmost economy in boiler installation, operation and maintenance. Write Dept. D6 for pamphlet giving full details of 17 points which are proven factors in making Stanwood boilers most economical on the market.

THE STANWOOD CORPORATION

Established 1891 **CINCINNATI, OHIO**

The Boiler with a pedigree



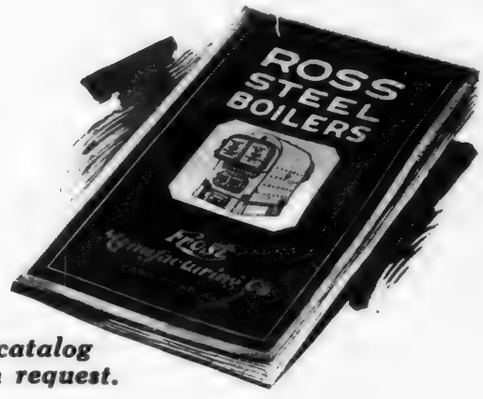
One of thirty sizes ranging in capacity from 400 to 27,000 feet.

The Ross Boiler has a long lineage of successful forbears

each in its period the best that engineering skill could produce based upon the superior performance of its predecessors.

From firedoor to smokebox, from injector to steam outlet every tube or chamber reflects the experience of three quarters of a century of boiler making.

ROSS Boilers are unique in design but behind each feature there is a practical reason, the results from which are quite evident to the engineer who will check his experience with the statements to be found in our catalog.

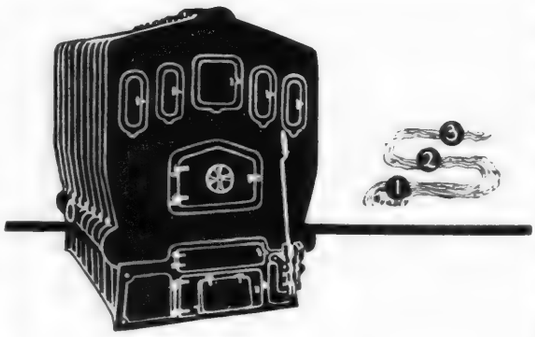


This catalog sent on request.

The Frost Manufacturing Co.

—Since 1851—

Main office and works 1520 HENDERSON ST., GALESBURG, ILL.



There are nine members of the Burnham Family, in round and square boilers, each adapted to its particular place and purpose.

The One, Two, Three of Oil Burning Economy

As you know, there is a wide variance of comparative costs in oil burning. At best it seems seldom to result in much better than an even break for residence heating.

This is largely due to most boilers having too short a fire travel. This means that the necessary air pressure under which oil burning must be conducted, carries the hot gases too quickly to the chimney, causing an excess of heat losses.

Those boilers having a long fire travel, not only baffle down the speed of the gases, but also muffle the noise.

The Burnham Square Sectionals, with their three times back and forth fire travel, give the highest of efficiency with oil fuels.

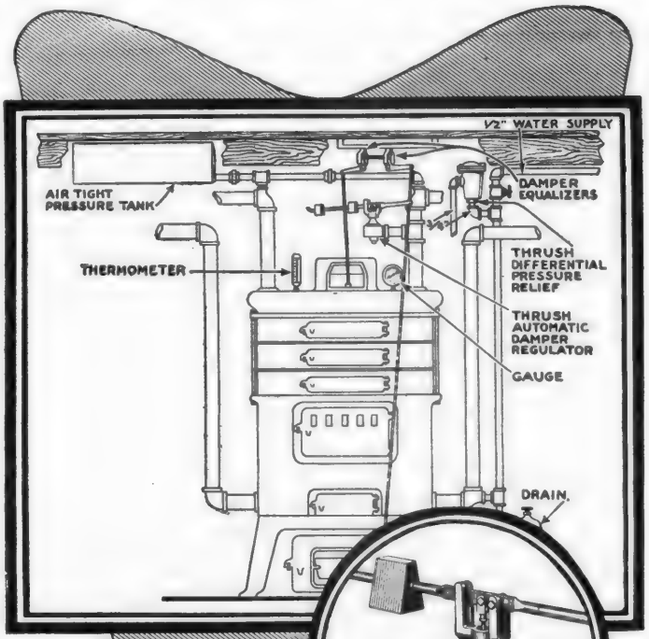
Burnham Boiler Corporation

IRVINGTON, N. Y.

New York Office: 30 East 42nd Street

Representatives in all Principal Cities

Canadian Offices:
Harbor Comm. Bldg., Toronto
124 Stanley St., Montreal



Thrush System of Hot Water Heating!

Installation as Simple as ABC

H. A. THRUSH & CO.
Peru, Indiana

Date.....19..

H. A. THRUSH & CO.,
Peru, Indiana.

Please send us your new catalog with prices. We are interested in Thrush System of Hot Water Heating.

Name .....

City .....

State .....

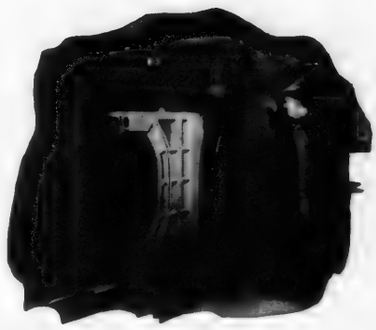
Greenwich Savings Bank, New York City, warmed by a battery of three 79″ Ideal Water Tube Boilers.

No building is too large for IDEAL BOILERS

Not only is there an Ideal Boiler installation to fit every kind of building from the smallest cottage to the largest skyscraper, but architects and engineers have proven that a battery of Ideal Boilers is the most economical heating system they can install in a big building.

And the reason for this is very simple. A heating plant is seldom called upon to operate at its full capacity. During mild weather only one or more boilers of the battery need be operated.

Every architect and engineer should have a copy of the booklet which describes in detail the Ideal Boilers that are heating many of the largest buildings in the world. The coupon below will bring you your copy.



Contact faces on all sections of Ideal Boilers are ground to perfect smoothness by special immense machinery—an exclusive feature of manufacture which insures a gas-tight construction of iron-to-iron contact at all points.

AMERICAN RADIATOR COMPANY

Showrooms and sales offices: New York, Boston, Providence, New Haven, Newark, Philadelphia, Baltimore, Washington, Richmond, Buffalo, Pittsburgh, Cleveland, Detroit, Cincinnati, Atlanta, Chicago, Milwaukee, Indianapolis, St. Louis, St. Paul, Minneapolis, Omaha, Kansas City, Denver, San Francisco, Los Angeles, Seattle, Toronto, London, Paris, Milan, Brussels, Berlin

Makers of IDEAL BOILERS *and* AMERICAN RADIATORS *and other products for heating, ventilating and refrigeration*

AMERICAN RADIATOR COMPANY
Direct Mail Advertising Dept. 124
1807 Elmwood Ave., Buffalo, N. Y.

GENTLEMEN: Please send me your booklet describing Ideal Water Tube Boilers.

Name_____

Address_____

City_____ State_____

MUELLER · Direct-Fired · Forced Air Unit

Cuts Industrial Heating Costs

Steam and hot water systems, with their costly radiation, are no longer the only satisfactory equipment for industrial heating. The Mueller Direct-Fired Forced Air Unit now offers engineers and plant owners dependable heating and ventilating service at a considerable saving in first cost and maintenance.

No radiation is needed. There is no danger of freezing, breakages, or shut-downs. No licensed engineer is required to run it. Burns low grade fuel.

A positive circulating system is provided for peak loads and quick heating periods, and a gravity system for night operation or when the building is unoccupied.

This Mueller Forced Air Unit may be operated singly or in batteries. Forced circulation assures movement of a large volume of air throughout the plant, resulting in increased efficiency of workmen because all stagnant air is eliminated.

Send for descriptive literature. Let our Engineering Department confer with you regarding your heating requirements.

L. J. MUELLER FURNACE CO.
267 Reed St., Milwaukee, Wis.
Established 1857

BRANCH OFFICES:
Chicago, Detroit, St. Louis, St. Paul, Minneapolis, Ft. Collins, Colo., Salt Lake City, Seattle, Baltimore.

Dealers Wanted

An opportunity for the Heating Engineer

The "Electric Furnace Man"

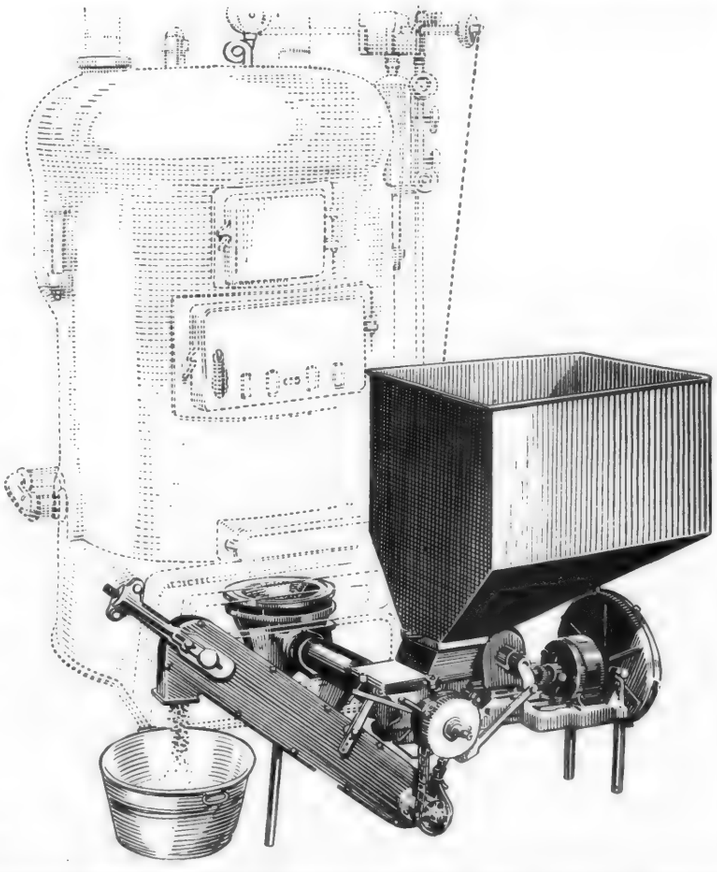
an automatic stoker—burns cheap coal—Buckwheat or Rice—puts coal on the fire—keeps fire burning—takes away ashes.

Operates electrically and is a time, money and labor saving device.

Can be installed easily and quickly in Hot Air Furnaces, Steam or Hot Water Boilers.

Some exclusive territory still available in the Eastern Anthracite Coal Burning District.

This is a real profitable business opportunity. Investigate now our agency proposition.



Domestic Stoker Co.
Seven Dey Street New York

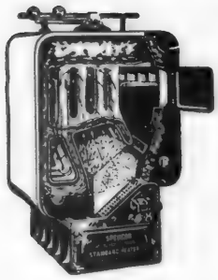
"The Spencer Heater is in a class by itself for various reasons, among them the economy of operation by the use of a cheaper grade of fuel. This boiler the writer knows operates very satisfactorily indeed with Buckwheat Coal. There are several installations of the Spencer Boiler right here in town, on which the writer had the engineering, and he is therefore speaking from practical experience.

"Another good feature of the boiler is that it does not require the constant attention that the average boiler does. Attention once a day is sufficient to get very satisfactory results.

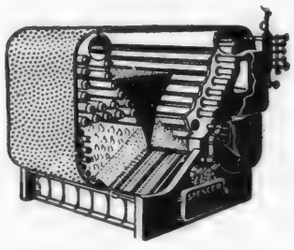
"The writer has yet to hear of the first one here in town which has not proven satisfactory either to the owner or the contractor. We do not hesitate to recommend them or specify them in any of our engineering work, for the main reason that there is no comeback on the job."

An Allentown, Pa., heating engineer wrote this letter after recommending and installing Spencers for heating jobs of all sizes from residences to factories and apartment houses.

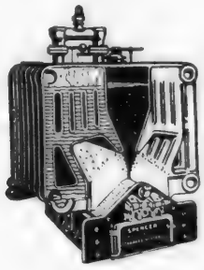
You, too, can share in this profitable business



SPENCER
Single Grate Heater



SPENCER Steel Tubular Heater
for large installations



SPENCER
Double Grate Heater

Spencer

steam, vapor or hot water

Heaters

burn No.1 Buckwheat coal

A size and type for every purpose *Sold only through heating contractors*

STANDARD HEATER COMPANY *General Offices:* WILLIAMSPORT, PA.

New York City Boston Philadelphia Baltimore Buffalo Rochester Hartford Washington Detroit Schenectady Syracuse Harrisburg Scranton

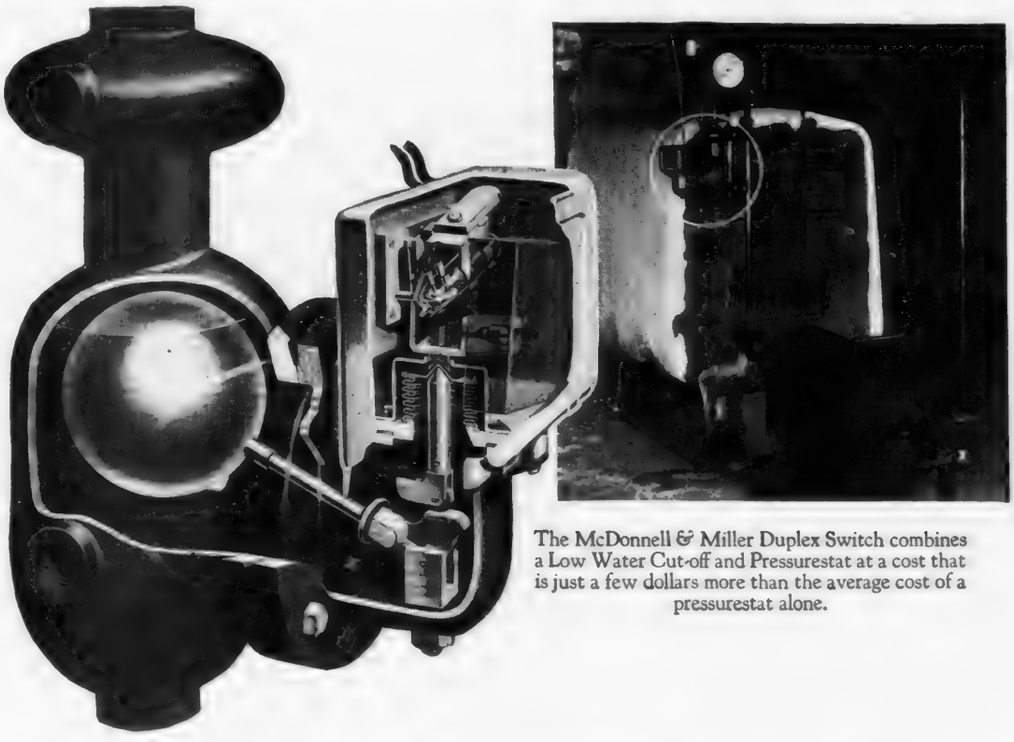
Why NATIONAL *SMOKELESS BOILERS Are Your Best Heating Bets*

1. They meet all smoke ordinances, and resist attempts to ***make*** them smoke.
2. They evaporate almost 28% more water on the same amount of fuel than boilers without a smoke consuming attachment.
3. They burn all grades of soft or Bituminous coal.
4. They can be fired by inexperienced firemen.
5. They reduce operating costs.
6. They are rated, not theoretically, but on a basis of actual performance.
7. They are available in a wide range of sizes.
8. They are backed by the National reputation for quality and performance.
9. They will give service that will thoroughly satisfy both you and your customer.

Write today for literature and discount sheets.

NATIONAL RADIATOR COMPANY
JOHNSTOWN, PA.
New York Philadelphia Baltimore Washington Richmond
Pittsburgh Cincinnati Cleveland Chicago

NATIONAL SMOKELESS BOILERS
CONFORM WITH SMOKE CODES EVERYWHERE



The McDonnell & Miller Duplex Switch combines a Low Water Cut-off and Pressurestat at a cost that is just a few dollars more than the average cost of a pressurestat alone.

As Easy as changing Spark Plugs

SIMPLICITY of installation makes the McDonnell & Miller Duplex Switch the logical unit for the oil burner dealer. To install it is only a few minutes' work.

Just take out the gauge glass, install the Duplex Switch and re-install the gauge glass in the tappings provided in the body of the Switch.

It goes without saying that—being a McDonnell & Miller unit—it is dependable and entirely capable of doing the job for which it is designed.

McDONNELL & MILLER

Wrigley Building Chicago

Duplex M&M BOILER CONTROLS Switch

Low Water and Pressure

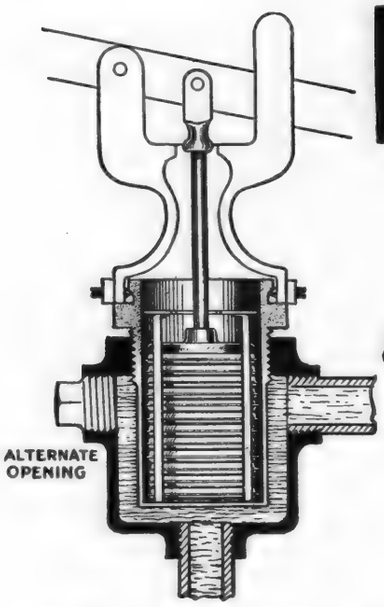
Please send complete information and prices on your McDonnell & Miller Duplex Switch.

Name.....

Firm.....

Street..... *City*.....

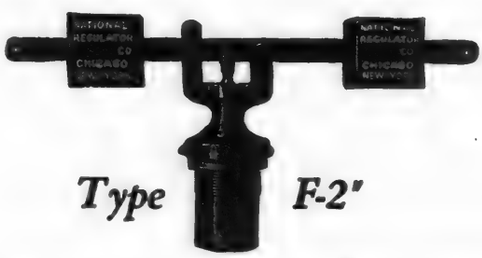
☐ *Dealer* ☐ *Manufacturer—Make of Burner Sold*.....



A New Fitting!

THIS new special fitting—shown in black—simplifies the installations of the Type F Regulator.

Type F Damper Regulator is always required to properly complete a Hot Water installation, just as a regulator is standard trimming on a steam boiler.



Type F-2"

METAPHRAM DAMPER REGULATOR

A sensitive but powerful device that makes a Hot Water plant more efficient, more satisfactory—and more profitable.

Metaphram is the trade name of the metal diaphrams which form the sensitive element in our regulators. These Metaphrams are separable, with "cage assembly" and may be lifted, as a unit, from the dry well in which they operate, should replacement be necessary. The well is placed in a 2-inch opening in boiler when available or installed in pipe line. The new special fitting simplifies installation in old work.

Specify Type F fitting when wanted.

Order Type F Regulator and Type F fitting from your jobber or direct. Circular on request.

NATIONAL REGULATOR CO.
2301 KNOX AVENUE CHICAGO

European Office: A. J. Aasheton, 18 St. Thomas St., London, S.E.1, Eng.

THE
W.D. CASHIN CO.
THERMOFLEX

Low Pressure Automatic Boiler Feeder

AUTOMATIC POSITIVE NON-FLOODING

Is fully described in bulletin No. 50. Let us send it to you. Is also made with an overflow feature if desired for abnormal cases.

WHY NOT?
ORDER ONE FOR TRIAL

MANUFACTURED BY

W. D. CASHIN COMPANY
35 HARTFORD STREET :: :: BOSTON, MASS.

INVESTIGATE
Gas House Heating!

Are you prepared to get your share of profitable business in this rapidly growing new field of modern heating?

You can if you make yourself known as the man who installs Ideal Gas Boilers.

New Jobs for Old

You can offer a heating service that means replacements of existing coal fired equipment in places where you could hardly expect to get new coal jobs.

You can get business in new homes, large and small, and in larger buildings too, for Ideal Boilers range in capacity from 225 ft. to 8000 ft., steam, water vapor and vacuum systems.

No Call Backs

Best of all, the gas company relieves you of servicing, which eliminates call backs and trouble jobs.

Special low rates for house heating have already been established by many gas companies and the practice is growing. Wherever these rates are in force there is a live and active market for gas boilers. The gas companies are opening up this wonderful field with continued constructive advertising and sales promotion work.

Co-operation with Gas Companies

It's to your advantage to co-operate with the gas company in the sale and installation of Ideal Gas Boilers.

This equipment is of the same high quality which characterizes all the equipment manufactured by the American Radiator Company. It is accepted as standard by several hundred gas companies.

We have complete descriptive matter giving capacities, sizes, ratings and full information on Ideal Gas Boilers.

Send Coupon for Details

You can hardly afford not to be thoroughly posted on this new field of bigger profits for heating contractors.

Take the first step to familiarize yourself with Ideal Gas Boilers and what they can do. Clip the coupon below and send it to us today. No obligation is involved. Act now and pave the way for new profits during the next heating season.

Ideal Type 1-G Gas Boiler

IDEAL Gas Boilers

Product of the AMERICAN RADIATOR COMPANY

American Gas Products Corporation

376 Lafayette Street DISTRIBUTORS New York City

AMERICAN GAS PRODUCTS CORP.
376 Lafayette St., New York City

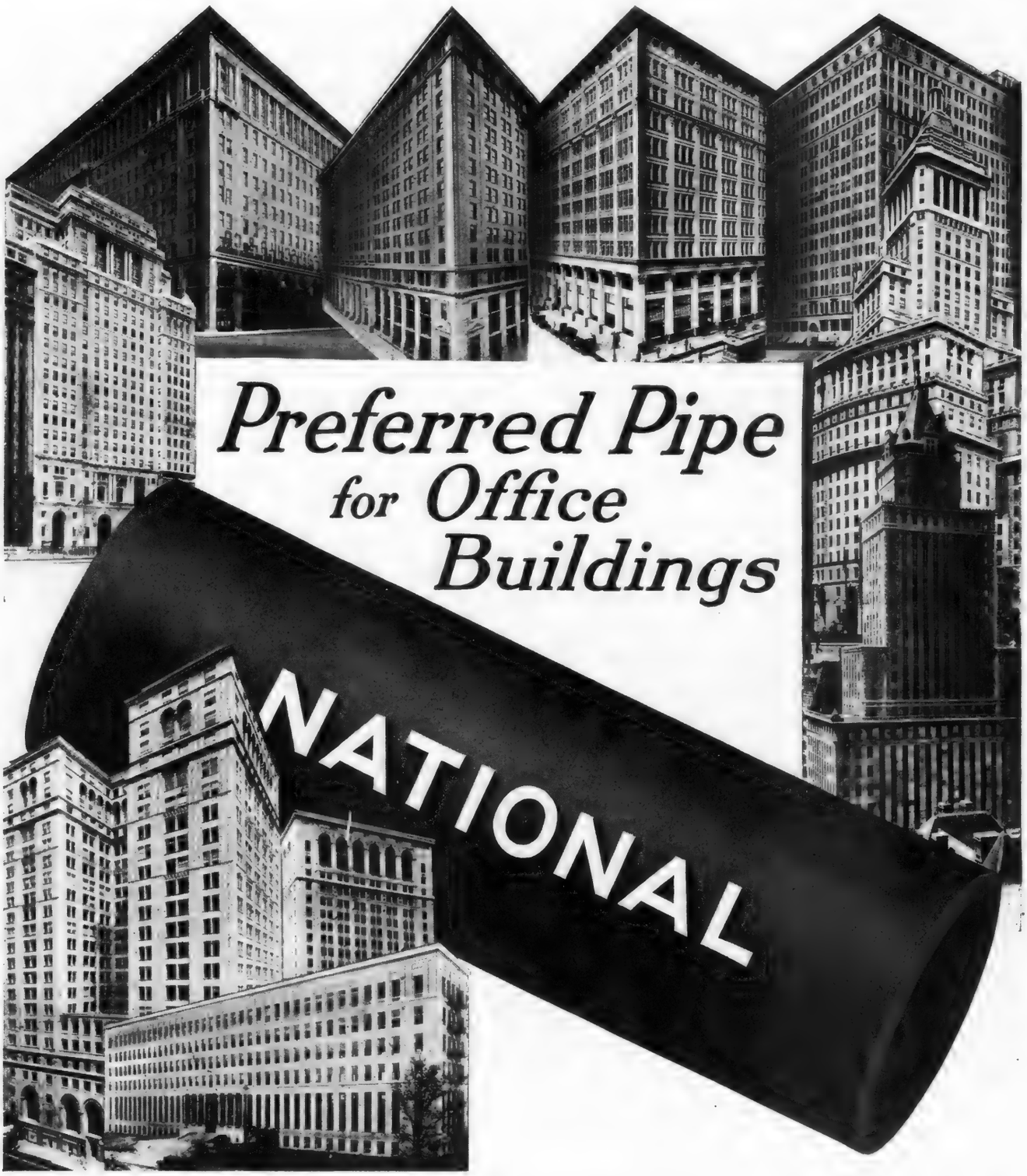
GENTLEMEN: Please give me further information about Gas House Heating.

Yours very truly,

Name_____

Address_____

City_____ State_____

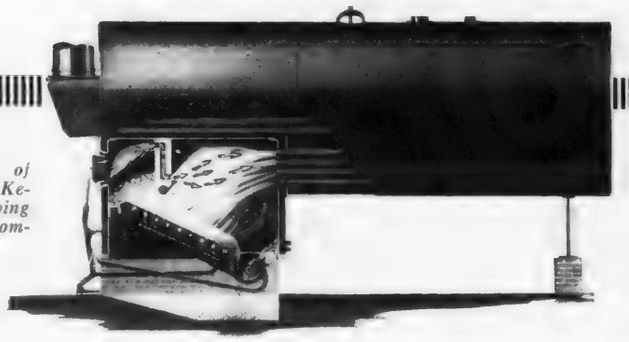


NO greater tribute to high quality and satisfactory service could be given than the frequency with which "NATIONAL" Pipe is specified for large buildings, the country over. In practically every large city, the more important office buildings are served with "NATIONAL" Pipe in order to insure long life and dependable service.

In these magnificent structures, involving millions of dollars and housing thousands of tenants, there is a great responsibility on the water, steam, gas and air lines that service may be maintained at all times. There can be no compromise with uncertainty; the need here is for modern pipe to meet modern conditions—pipe that is made by processes which insure the utmost reliability. A cross section of the country's finest office buildings will show a strong preference for "NATIONAL" Pipe—The Recognized Standard for Building Purposes, and made by the largest manufacturer of wrought pipe in the world.

NATIONAL TUBE COMPANY PITTSBURGH, PA.

DISTRICT SALES OFFICES IN THE LARGER CITIES



Typical Installation of CombustiKator in Kewanee Boiler Showing Simplicity of the CombustiKator.

"one boiler at double capacity . . . with 40% fuel saving . . ."

This is what Mr. J. A. Elliott, Manager, Liberty Building, Des Moines, Iowa, says about the **CombustiKator:**

"It not only heats a 12-story building covering a quarter block, but also a 4-story building covering the quarter block just west of us.

"All our boilers are 150 hp. and we had to operate two of them in any kind of weather, to get the required heat. With the **CombustiKator,** however, we have been operating only one boiler, producing more than double capacity, or 325 hp. Even in December, with a regular blizzard that blew out two plate-glass windows on our ground floor and with a temperature about 10 deg. above zero we had no trouble heating both buildings with one boiler with the **CombustiKator.**

"Formerly we burned coal at $6.00 per ton. With the **CombustiKator** we are burning coal at $3.50 per ton and are using less coal. We are saving 40% in fuel. We are more than satisfied."

A 40% fuel saving means a great deal to the building owner and to the consulting engineer and architect specifying the **CombustiKator.** The ability to obtain double capacity—325 hp. from a 150 hp. boiler—means a great deal when it comes to choosing equipment because of its influence upon initial cost, reserve capacity, etc. These are outstanding benefits, of course.

But, in our opinion, the greatest and most vital feature of the **CombustiKator** is its simplicity.

All hand cleaning of fires has been eliminated. The fireman can no longer interfere with combustion, to waste fuel or cause smoke. Firing the large boiler is as simple as firing the small boiler. The smaller and cheaper grades of coal give better results than the larger sizes and more expensive grades of coal.

The **CombustiKator** has been called "the perfect fireman". Every installation of the **CombustiKator** is similar to the one mentioned above—fuel saving, increased capacity, satisfaction.

Here's why

the CombustiKator has been called "the perfect fireman":

Only 3 simple operations —each easy and foolproof.

1. Throw coal against wall.
2. Pull on lever advances fuel over inclined bed, leveling, renewing, cleaning fuel bed and keeping it free from ash.
3. Release of lever discharges ash into ash pit.

Nothing could be simpler. No skill is required. Mistakes are impossible.

Other CoKal Products

HAND FEED STOKERS
HOPPER FEED STOKERS
POWER FEED STOKERS

The CombustiKator Company

Division of CoKal Stoker Corporation

1014 Wrigley Building, Chicago

Kansas City *New York City* *Philadelphia* *Pittsburgh* *St. Louis*

INSIDE HOPPER GRAVITY FEED

COKAL COMBUSTIKATOR

Reg. U. S. Patent Off.

CORRECT COAL BURNING ASSURED

LAVIGNE GRADUATED PACKLESS Quick Opening STEAM RADIATOR VALVE

A high-grade, packless, steam radiator valve of approved design, offering the graduated feature at a reasonable price.

The graduated dial and lever pointer handle effect easy and positive regulation of temperature—the valve may be fully opened or closed by giving the handle a seven-eighths turn.

A double adjustment permits each valve to be accurately set to a wide range of radiator sizes.

Your Jobber Can Supply You

Commonwealth Brass Corporation
Detroit

COMMONWEALTH
LAVIGNE
Radiator Valves

When piping expands and contracts

Fig. 106, screwed, Jenkins Standard Bronze Globe Valve

When piping expands and contracts, a lot depends on the valves. If the valves must be replaced every time, valuable customers will be annoyed at the frequency of repairs.

Fig. 168, Jenkins Bronze Radiator Angle Valve with male union

You run no such risks when your men use genuine Jenkins Valves, valves with the extra sturdiness that is more than a match for a straining pipe.

Fig. 325, screwed, Jenkins Standard Iron Body Gate Valve

Good metal, good design, good workmanship—these are the reasons behind the good reputation of Jenkins Valves—a reputation covering a period of over 60 years.

JENKINS BROS.

80 White St.....New York, N. Y.
524 Atlantic Ave.....Boston, Mass.
133 No. Seventh St....Philadelphia, Pa.
646 Washington Blvd.....Chicago, Ill.

JENKINS BROS. LIMITED

Montreal, Canada London, England

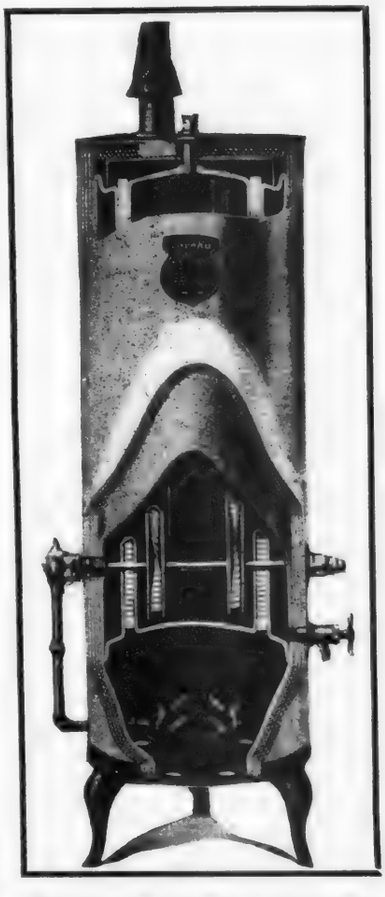
Always marked with the "Diamond"
Jenkins Valves
SINCE 1864

LoveKo

AUTOMATIC STORAGE WATER HEATERS

are equipped with

BARBER PATENTED JET GAS BURNERS



Lovekin Heater Manufacturing Company turns to BARBER PATENTED JET GAS BURNERS for their new LOVEKO Automatic Storage Hot Water Heater. The Loveko is designed to heat quickly and operate efficiently, to save gas with safety, and to withstand the marks of time. Lovekin Heater Manufacturing Company knows that an important function of the heater is the burner—that without the right burner, no appliance can endure. Therefore, BARBER BURNERS fit, in every respect, their requirements.

BARBER Patented JET GAS BURNERS are the result of long years of research and improvements. Eighty percent of the most prominent makes of hot water heaters have been subjected to comparative tests in our own laboratories. In every instance where Barber Patented Jet Burners were installed, the efficiency of the appliance has been improved—a substantial saving of gas has been effected; backfiring, carbon and fumes have been eliminated. Barber Patented Jet Burners require no servicing and they function perfectly in practically all gas districts throughout the United States and Canada.

Manufacturers of gas appliances will find us ready to subject their appliances to accurate tests in our well-equipped laboratory, at no expense to the manufacturer, in the effort to attain a greater degree of efficiency through the use of Barber Jet Burners. Tell us your problems and we will strive earnestly for a correct solution. Our descriptive literature and prices of Barber Jet Burners will be mailed on request.

Among the many Heater Manufacturers who have adopted and are using "Barber Patented Jet Gas Burners" are the following:

American Radiator Co.
Barton-Roth Co.
Bastian-Morely Co.
Bryan Steam Corp.
Coast Heater Mfg. Co.
Day & Night Water Heater Co.
Detroit Range Boiler & Steel Barrel Co.
Geneva Heater Co.
Gewert Mfg. Co.
Hoffman Heater Co.
Hotstream Heater Co.
Edw. Katzinger Co.
Lovekin Water Heater Co.
Melrose Water Heater Co., Inc.
New Way Mfg. Co., Inc.
Piatt Water Heater Co.
Sands Mfg. Co.
Simplex Heater Co.
Snap-O-Stat Co.
Southard Robertson Co.
Superbo Water Heater Co.
Superbo Mfg. Co.
Welsbach Co.
Walter Mork Heater Co.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, Cleveland, Ohio

EACH RADIATOR AN INDEPENDENT STEAM HEATING PLANT

Powers Engraving Co., office, New York City

The Extra Cost so Little The Advantages so Great

A heating system that permits of starting the boiler a month or two later in the fall; shutting down the boiler a month or two earlier in the spring, is certainly advantageous.

Such a system is easily obtainable. It is simply the use of Clow Gasteam Radiators in rooms requiring heat in mild weather, such as dining rooms and living rooms of apartments, or in office buildings.

The Clow Gasteam Radiators are a part of the standard heating system. When the heating plant is going, they act as ordinary radiators. When the heating plant is shut down at nights, or in the spring and fall, the Gasteam Radiators supply quick, healthful heat, when and where it is wanted.

Clow Gasteam Radiators are supplied fitted for either vacuum or vapor, one or two-pipe systems. Also Clow Gaswater Radiators for Hot Water Systems.

JAMES B. CLOW & SONS
201-299 N. Talman Ave., Chicago
Offices in Principal Cities

CLOW
GASTEAM — GASWATER

The new Silent

NO COAL NOKOL
AUTOMATIC OIL HEATING FOR HOMES

is here!

NOISE cut to the vanishing point.

Past high efficiency maintained—and even increased.

Just as a matter of information on automatic oil heat's most sensational comfort-development, it should benefit Architects, Builders, Heating Contractors to have all data on:

THE NEW

Silent NO COAL NOKOL
AUTOMATIC OIL HEATING FOR HOMES

First domestic oil burner listed by Underwriters' Laboratories; approved by all leading safety boards. Manufactured and guaranteed by AMERICAN NOKOL COMPANY, Chicago.

Address: **The American Nokol Company,**
215 N. Michigan Ave., Chicago, Ill.

RAYFIELD

PATENTS PENDING

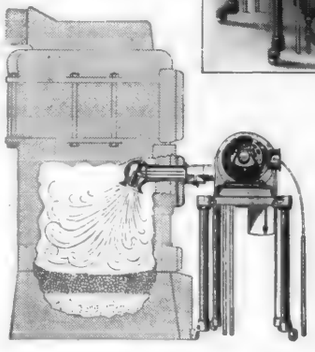
Automatic Fuel Oil Burners

Note These Important Features

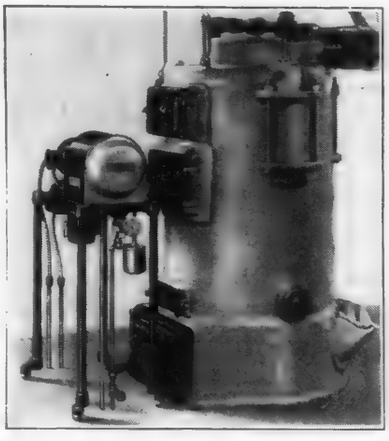
1. Utilizes the Radiant Heat Principle.
2. Positive Electric Ignition.
3. Air-cooled, Non-carbonizing Nozzle.
4. Triple Atomization.
5. Double-Length Flame Travel.
6. No Baffling Walls.
7. Really Quiet (not maybe).
8. Rayfield Flame Safety.
9. Latest Minneapolis Controls.
10. Complete Line—5 sizes.
11. Burns Fuel Oil—28/30 For Homes: Lower Gravities for Factories.

Rayfield's Scientific Combustion

Note the illustration. The nozzle is suspended over the fire pot. The vapor, burning in suspension, is forced directly downward to the crushed fire brick at the bottom, then deflected to the sides and rises evenly along the walls of the fire box before the generated heat escapes through the flue. In this manner the flame travels twice the usual distance in the fire box, giving off the maximum heat at the bottom of the fire box and completing combustion before reaching the flue.



The Radiant Heat principle is utilized through the bed of crushed fire brick placed in the ash pit. In operation this brick quickly becomes incandescent, absorbing and holding the heat that would otherwise be lost up the chimney. Long after the burner has been shut off by the thermostat, this white-hot bed of crushed brick continues to radiate its stored heat and thus assists in maintaining an even temperature throughout the building.



The Rayfield is a Super-system of heating designed and perfected by Chas. L. Rayfield, inventor of the well-known Rayfield Carburetor for automobiles, and an acknowledged authority on the combustion of liquid fuels.

Built by Engineers—Approved by Men Who Know the Heating Business

Heating plant engineers, manufacturers and oil-burner men quickly approve the Rayfield after inspection and testing.

These men came to see what we have. Some of them were open-minded, some were not. They witnessed demonstrations, inspected burners in operation, talked to users and made tests under their own conditions.

As a result of their observations they report that the Rayfield is:

—a simple and quiet power burner

—correct from an engineering standpoint

—equipped with remarkable safety controls.

You are invited to make a similar investigation of the Rayfield, and you should do it if you are following the trend of the heating trade toward oil burning.

For Steam, Vapor, Hot Water, Hot Air

The Rayfield is fully automatic and operates successfully in any good heating plant. It comes in various sizes and has had three years of practical tests in homes, apartments, theatres and factories.

You have been waiting a long time for this scientific oil burner—a burner that you would readily install in your own home after seeing a demonstration.

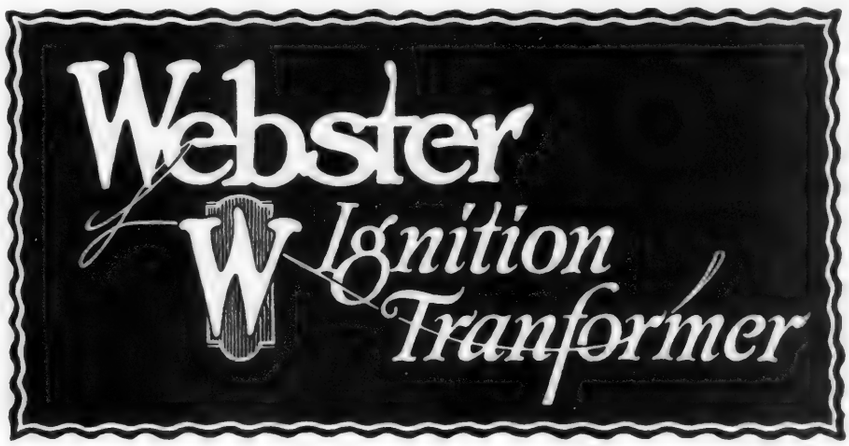
Send for illustrated circular.

Rayfield Mfg. Co.

21st and Rockwell Sts. CHICAGO

Contractor-Dealers Wanted

The Rayfield franchise will appeal to men who know the heating business. A profitable connection is offered responsible parties who are prepared to demonstrate, sell and install our equipment. Write for territory and further particulars.



Announcing

The Webster Ignition Transformer Designed for Oil Burner Ignition

DURING the past eighteen months the Webster Oil Burner Coil has been adopted as regular equipment by many of the leading oil burner manufacturers. Today, it is rendering a high degree of satisfactory service on practically every type of motor driven domestic oil burner.

Through the experience gained in adapting the Webster Oil Burner Coil to a wide variety of burner designs, it has been found that there are some ignition requirements which demand the use of a Transformer . . . .

For this reason we now announce the development of the Webster Ignition Transformer, specially designed for oil burner ignition. The perfection of this Transformer provides a complete line of ignition devices, making it possible for this company to supply electric ignition for any oil burner.

This new Webster Ignition Transformer contains many unique and advantageous features—details of which will be supplied upon inquiry . . . . . .

Webster Electric Company

Racine, Wisconsin, U.S.A.

"SPECIALISTS IN OIL BURNER IGNITION"

A Bear and a Business
Get weak while "Asleep"

The black bear goes to sleep in the fall fat and strong. He wakes up a few months later lean, hungry, weak. That's much like the highly seasonal oil burner sales business. "Fat" profits—then a gradual eating up of the earnings to keep the business alive during quiet months.

Why go through this building up and tearing down process? Stabilize your business, eliminate quiet months.

Double Franchise For Year 'Round Sales

We have shown a large number of oil burner dealers the way to steady profits with our double franchise for the Combustion Fuel Oil Burner and the Milwaukee Air Power Water System—two real leaders, big sellers, time-proved money makers. Quiet months in oil burner selling are boom months with the Milwaukee Air Power. Quiet "water-system" months are big months for the Combustion.

The Nozzle type Combustion is adaptable to both domestic and industrial heating, two big sales-fields. Has been an outstanding success for over six years. Combines many important sales-making features. (Read list at right).

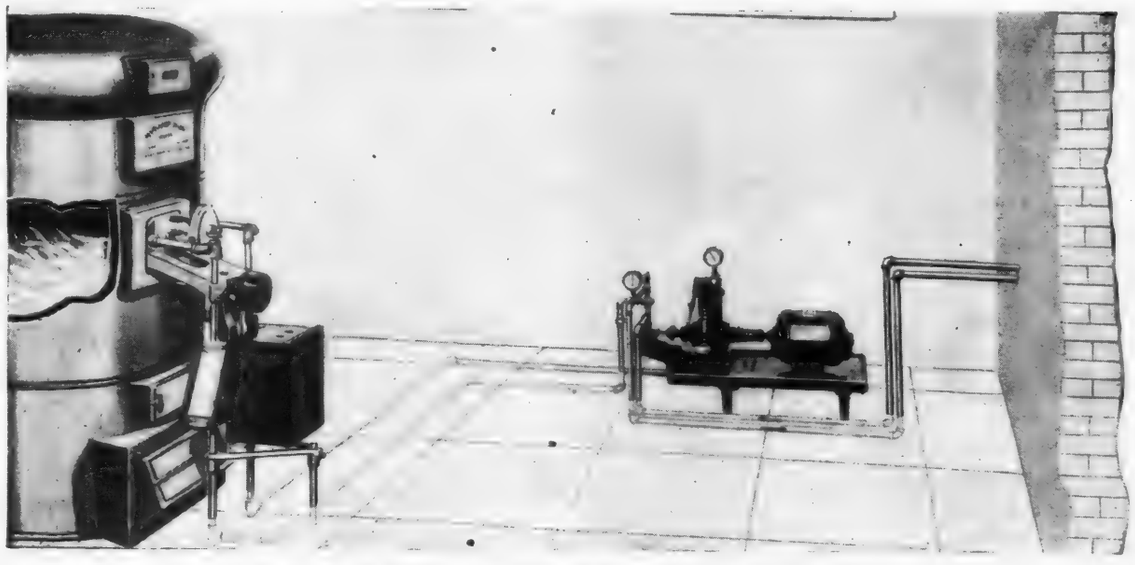
The Milwaukee Air Power Water System has the famous double-cylinder air power pump. Gives high-pressure water service from a number of sources, well, spring, cistern, lake. Simple, dependable, completely automatic. Capacities: 100 to 5,000 gal. per hour. For over 15 years first choice of those who want the finest. Write today for complete facts.

COMBUSTION FUEL OIL BURNER CO.
13 Keefe Ave. Milwaukee, Wis.
Subsidiary of Milwaukee Air Power Pump Co.

The Combustion Fuel Oil Burner

Outstanding Sales Features

1. An automatic system burning fuel-oil. Suitable for domestic or industrial use. Nozzle type—the same principle used in steel mills and by U. S. Navy for many years. Insures utmost atomization and combustion.
2. Manufactured since 1919. Thousands in use all over the country. A safe, dependable burner.
3. Quiet in operation.
4. No smoke, dirt or oder when properly adjusted. No labor required.
5. A minimum of moving parts: only 3—motor, compressor, oil pump.
6. Automatically self-lubricating.
7. No complicated clock mechanism, gears, cams, levers, rods or drip cans.
8. No alteration to boiler or furnace required.
9. Flooding with oil is impossible. Perfect control of fuel, which flows only when needed.
10. Oil flow is governed by air or pump pressure. Stops when motor stops.
11. Only low pressure is required. Perfect control, high pressure impossible.
12. Built with pump unit or with service tank.
    Tank, motor and pump can be installed in any convenient part of basement. Gas or electric ignition. Economizer provided on all gas-fired units.
13. All pipes are small and may be installed under concrete floors.
14. Insures a high degree of heating efficiency.
15. Listed as Standard by the Underwriters' Laboratories.



Installation of Combustion Fuel Oil Burner, Pump unit type

Play safe! Install only Oil Pumps that *you can depend on!*

Monroe Automatic Oil Pump. Type TJ.

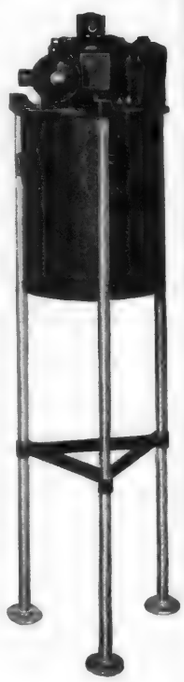
WHY flirt with trouble on one-season experiments? Experience counts big in designing and building pumps. The dealer is the goat when the pumps have to be tried out and their principles proved in service. The Monroe pump, built up through sixteen years of pump manufacturing experience—backed by four seasons of test on oil burners in constant operation—is now ready for installation at the moderate price of $85.00 list.

MONROE Oil Pump

PLAY safe, Mr. Oil Burner Dealer! Sell your customer lasting satisfaction in oil pump as well as oil burner. Make every customer a booster. Make every oil burner you sell help sell more oil burners for you. You can do this now when you install the Monroe TJ at $85.00 list.

The illustration suggests the extreme simplicity and great durability of this unit, which is equipped with a silent Janette Motor. Mount it on the floor, use standard pipe for legs—get just the height you desire for the job—with no chance of vibration being broadcast through the house along the partitions on which wall equipment is mounted.

These units are being ordered by hundreds—more than meeting all critical demands imposed on them. You are always backed by a five-year guarantee on Type TJ.



YOU owe it to yourself, if you haven't already become acquainted with the Monroe Oil Pump, to order one today. Try it out. Install it on a unit for your most particular customer. Give it the hardest test you can. Then order quantities. Specify the Monroe Oil Pump, Type TJ, on contracts where a popular priced pump is desired.

TYPE TJ. LIST

$85

NEW YORK
149 Broadway
Singer Bldg.

Monroe Machine Tool Co.
737 W. Jackson Blvd., Chicago, Ill.

PHILADELPHIA
437 Real Estate
Trust Building.

HOME IS WHERE THE HART IS

The Steady Sales Pull of the Hart Oil Burner

If you want more sales in summer to help balance your business, you can get prompt and sure results with the Hart Oil Burner. Home owners are quick to recognize the benefits of hot weather installation.

Conversion of the heating plant is of course simplified during the period when the plant is not in operation. Then the buyer knows the burner will be ready to operate in the first cool days of fall when only occasional heat may be required.

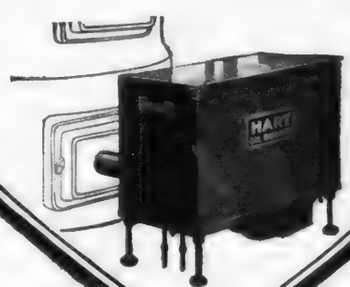
The buyer also welcomes the opportunity to become thoroughly familiar with the new oil burner before the onset of cold weather.

The owner is certain to get prompt delivery and unhurried installation. Last fall most Hart dealers had more orders than they could fill.

The Hart Oil Burner is listed by Underwriters' Laboratories, Inc., to burn fuel as low as 28 degrees, Baume test. Can be attached to any heating plant, hot air, hot water, steam or vapor, in five hours' time.

With the backing of a big national advertising campaign, we are now adding to our nation-wide dealer organization. If you are qualified to represent the Hart, we'd like to hear from you, provided of course there is no Hart dealer appointed for your community.

W. B. WILDE CO., *Peoria,* Illinois



A deferred payment plan offers the customer a special inducement to buy in summer

Hart Electric Icer. A new and highly developed iceless refrigerator for the home

HART OIL BURNER

W. B. WILDE CO.
2136 North Adams Street
Peoria, Illinois

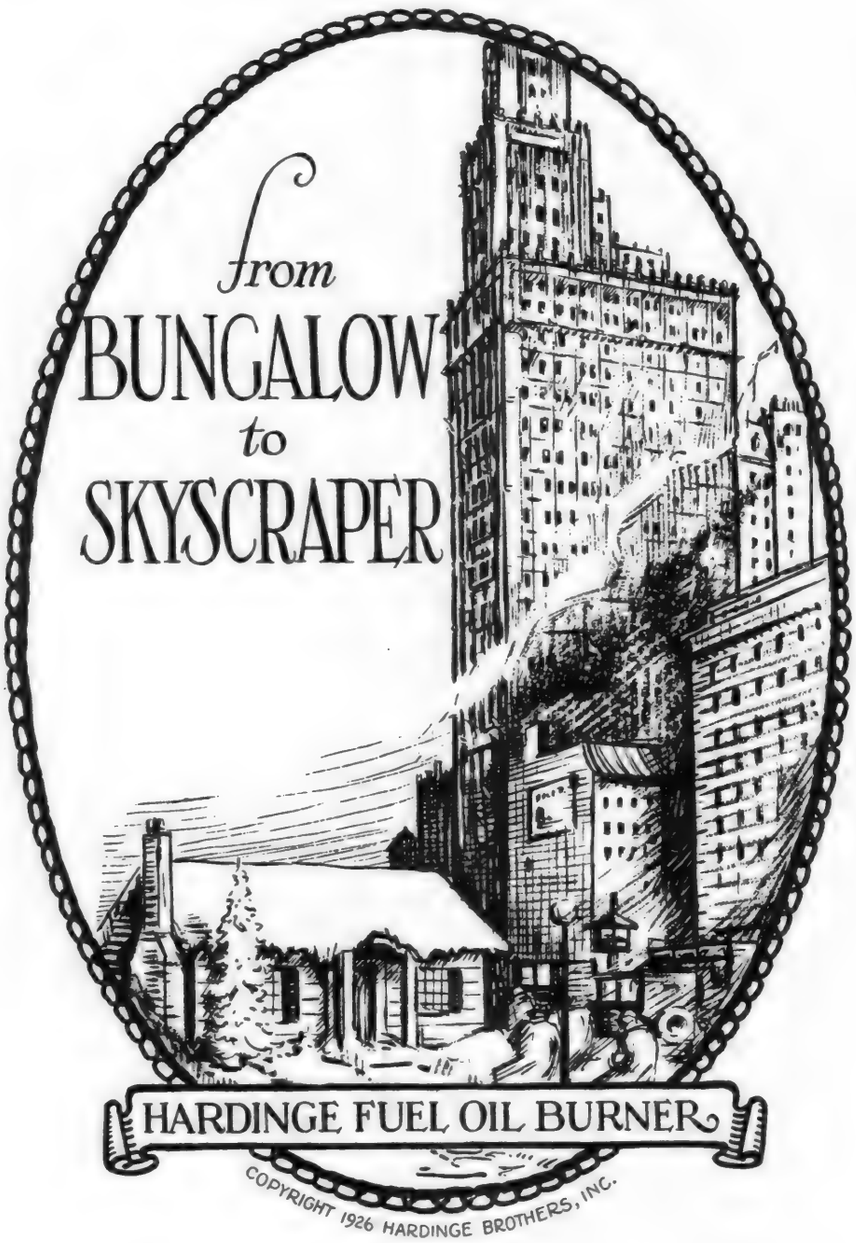
You may send me without cost or obligation, your latest booklet on Oil Heating.

Name.....

Street.....

City.....State.....

HARDINGE



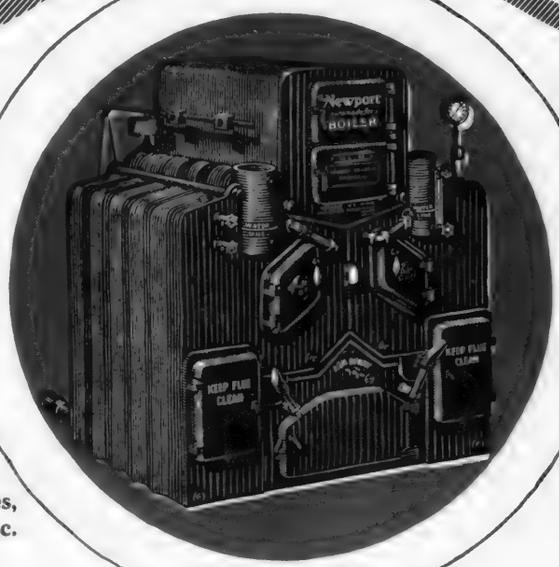
We invite correspondence from responsible dealers in the heating industry to sell the Hardinge burner in territories not yet allotted.

Please understand that in signing a contract with us for specific territory, we do not require you to order any definite number of burners, as burners will be shipped only as required.

In other words, nowhere in the Hardinge contract will you find definite specifications relative to the number of burners to be purchased with the signing of the contract.

Guaranteed for ten years. Both domestic and industrial burners listed as standard by the Underwriters' Laboratories and approved by the New York City Board of Standards and Appeals. Economical, practically noiseless and dependable. Range of application—from "bungalow to skyscraper." Manufactured by Hardinge Brothers, Inc., whose name and products are known throughout the world. We again invite those who can qualify to join the Hardinge sales organization.

Hardinge Brothers, Inc., 4149 Ravenswood Ave., Chicago



Magazine Feed

Oil Burning

For All Types of Buildings— Bungalows, Homes, Apartments, Etc.

Endorsed by The Best Heating Engineers and Architects

ANTHRACITE

BUCKWHEAT — No. 1 — $7.00 PER TON

COAL

HEAT VALUE ALIKE REGARDLSSS OF SIZE

HALF PRICE

WHEN USED BY NEWPORT BOILERS

New York City—Daily Paper—Advertisement—Stove Size Coal $14.50—Buckwheat Coal $7.00, Published April 1, 1926.

Contracts are speedily closed when these facts are brought to a prospect's attention, even tho the saving may only be $5.00 per ton. Most heating contractors are aware, that the cost of the larger, more expensive, fuels required by ordinary surface feed boilers, together with the drudgery of constant attention, has lost its appeal and are rapidly being supplanted by more modern types.

The Public's demand for maximum convenience, economy, uniform heat, for long periods without attention and adaptability of heater to all sizes and kinds of fuel, coal, coke, or oil, can be completely met by no boiler, other than the Newport.

BEAR IN MIND NEWPORTS ARE NOW WITHIN THE MEANS OF ALL— THEY ARE MODERATELY PRICED.

Figure Newports on every job and give your prospects an opportunity to reduce heating costs and enjoy the benefits of this wonderful boiler, as thousands of others have been doing for the past fourteen years.

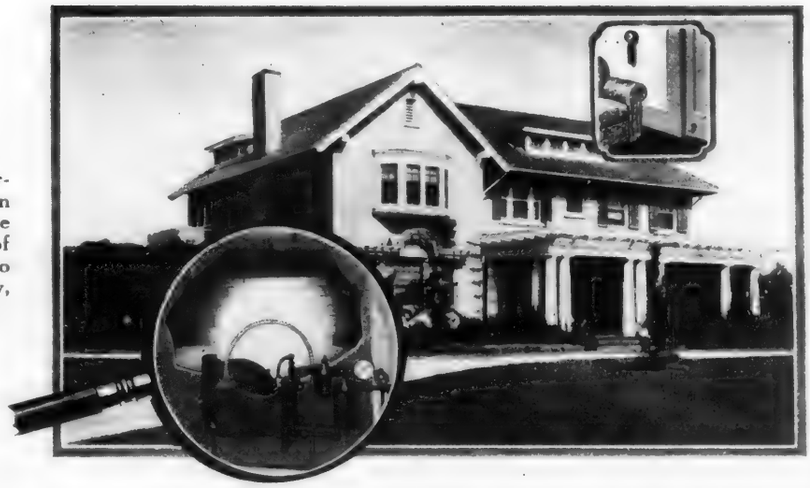
WE INVITE CORRESPONDENCE —FROM DEALERS, JOBBERS AND RESPONSIBLE SALES REPRESENTATIVES

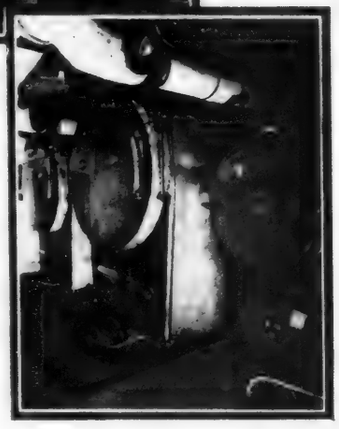
NEWPORT

BOILER COMPANY CHICAGO, ILLINOIS

529 SOUTH FRANKLIN STREET

BANISH coal-bins forever. S. T. Johnson Co. Oil Burners are heating hundreds of homes from Maine to California, efficiently, safely, economically.





Commonwealth Hotel, Chicago. Heated by S. T. Johnson Co. No. 4½ Oil Burners, which are shown at right installed in boilers.

JOHNSON OIL BURNERS®

Developed Through 20 Years of Successful Manufacturing

THE improved S. T. Johnson Co. Rotary Oil Burner is backed by 20 years' successful manufacturing experience.

Made in five sizes for both heat and power—with or without oil pump. Engineers pronounce it "the most scientifically constructed oil burner on the market."

Listed as standard by Underwriters' Laboratories. Safe, clean, quiet.

And now—Automatic Control

THIS famous, proven burner is now available with full automatic control. Positive regulation combined with safety. Greatly broadens the sales field of Johnson dealers. Some attractive territory still open. Write or wire for information. Ask for new booklet.

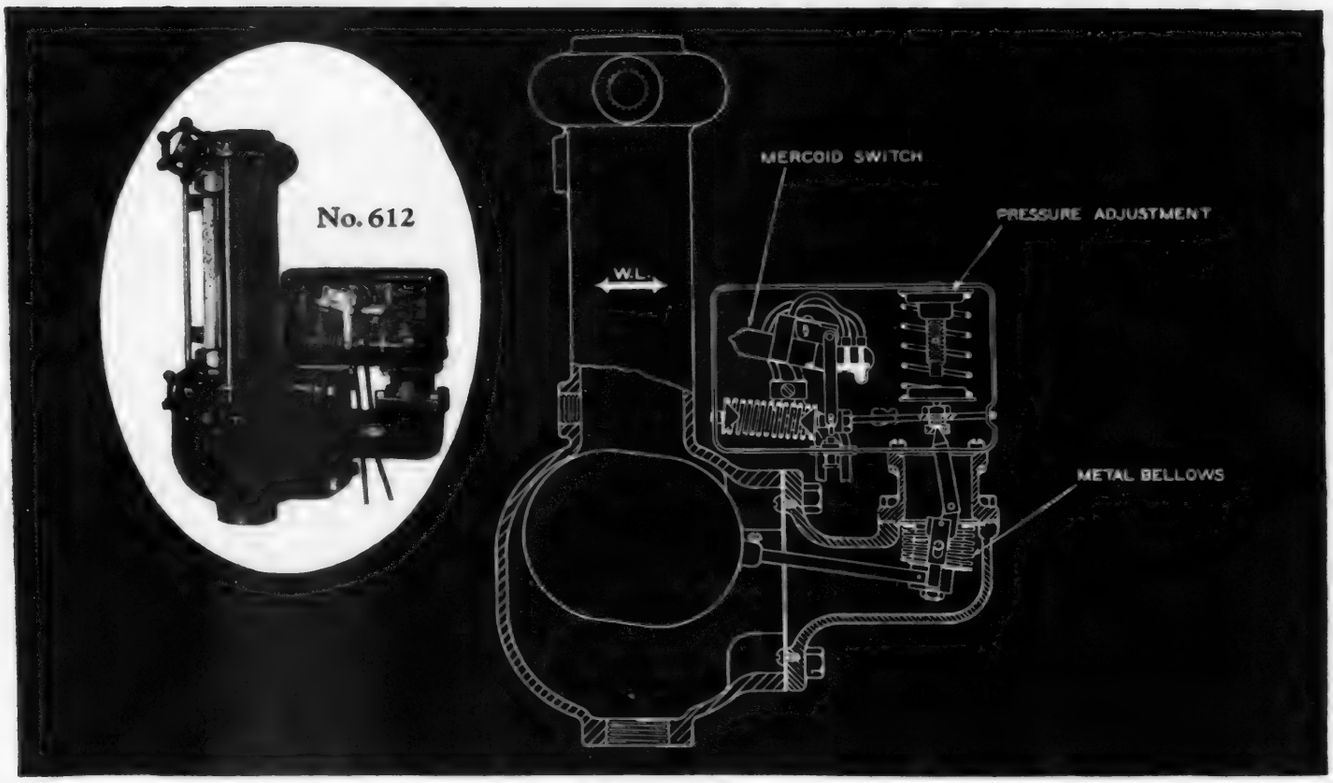
Main Office and Factory:
940-950 Arlington Street
OAKLAND, CALIFORNIA

S. T. JOHNSON CO.
OIL BURNERS
TRADE MARK REGISTERED
FOR EVERY SERVICE

Distributors and Dealers Throughout the United States and in Foreign Countries

5-426

Factory Branch Offices: San Francisco, Sacramento, Philadelphia



Combination steam pressure control and low water cut-out

THE owner of an automatic oil burner seldom needs to visit the basement. He may not know when the water is low in his steam boiler —and serious damage and expense may result.

The diagram above shows a positive means of avoiding this danger by an adaptation of the famous Mercoid principle. It is the cheapest insurance an owner can buy for his boiler.

By using a bellows as a stuffing box, our engineers have been able to combine steam pressure control with low water cut-out *in one instrument,* saving the cost of a separate pressure control.

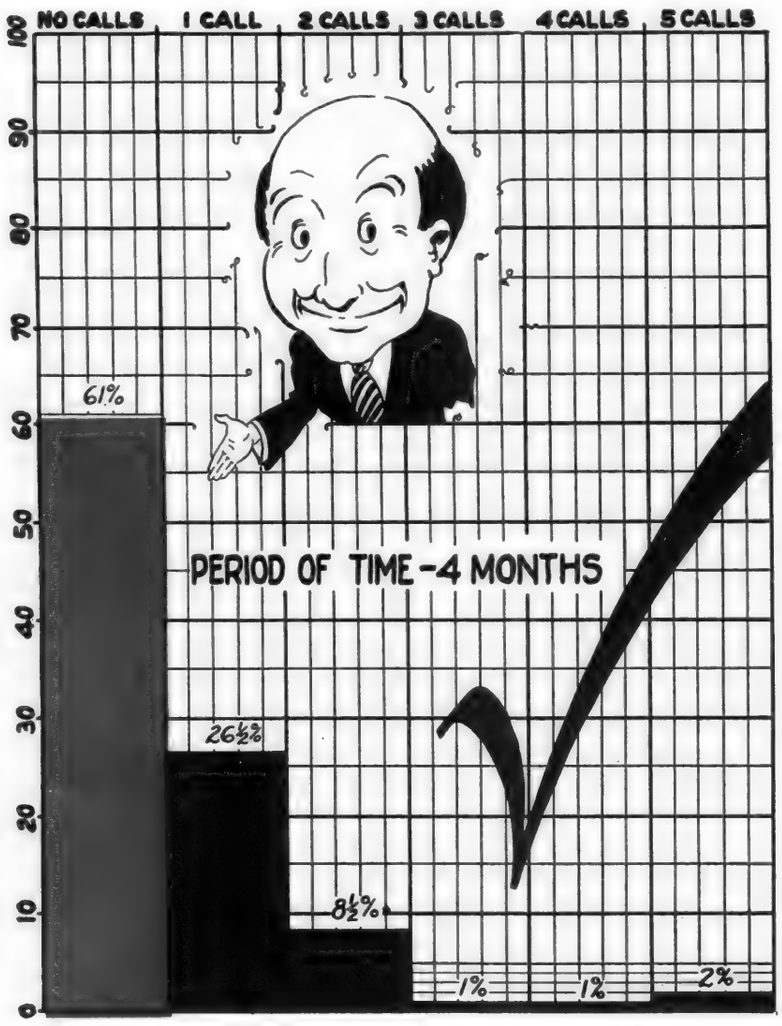
This control is connected into the main line circuit to the motor, providing a positive safeguard against low water or excessive steam pressure. *Mercoid controls take full line current.* Can also be furnished with three-wire circuit for low voltage.

Write for further details and prices.

AMERICAN RADIATOR COMPANY

Specialties Department

816 So. Michigan Ave., Chicago, Ill.



An ABC

Dealer's Service call record

61% of Burners—No Calls
21½% of Burners—One Call
8½% of Burners—Two Calls

The other calls the dealer classifies as "chronics"—No oil, etc.

Few Service calls—that's one reason why ABC dealers make money

More than one oil burner dealer knows that it is one thing to sell oil burners—but another thing to service them.

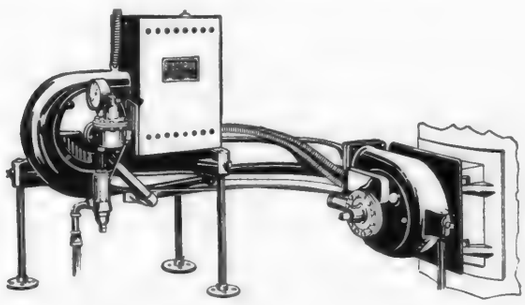
ABC is simple—only one moving part that can wear. Service calls are low. Profits are certain.

Listed as Standard by Underwriters' Laboratories

AUTOMATIC BURNER CORPORATION
312 N. May Street, Chicago

ABC OIL BURNER

no noise ~ no carbon



Let's Talk Facts, as One Business Man to Another

Men with the vision of the broadening market in the oil burner business, and the capacity to establish and actively promote the sale of one of the largest-selling oil burners in America, will be interested in the Electrol proposition.

If you believe, as we do, that the real opportunity to build a growing, paying business of your own is with a burner in which *successful operation* and *service* are placed above price —we should be able to make an arrangement which will be mutually profitable.

Let's talk over the facts, as one business man to another. In person if possible. By letter first if you prefer.

The Electrol Automatic Oil Burner embodies every feature essential to successful oil burner operation:—

Automatic Electric Ignition, Mechanical Atomization, Quiet Operation, Eight-day Clock Thermostat—and a remarkably effective Master Control.

HOME APPLIANCE CORPORATION . . . . . ST. LOUIS, U. S. A.

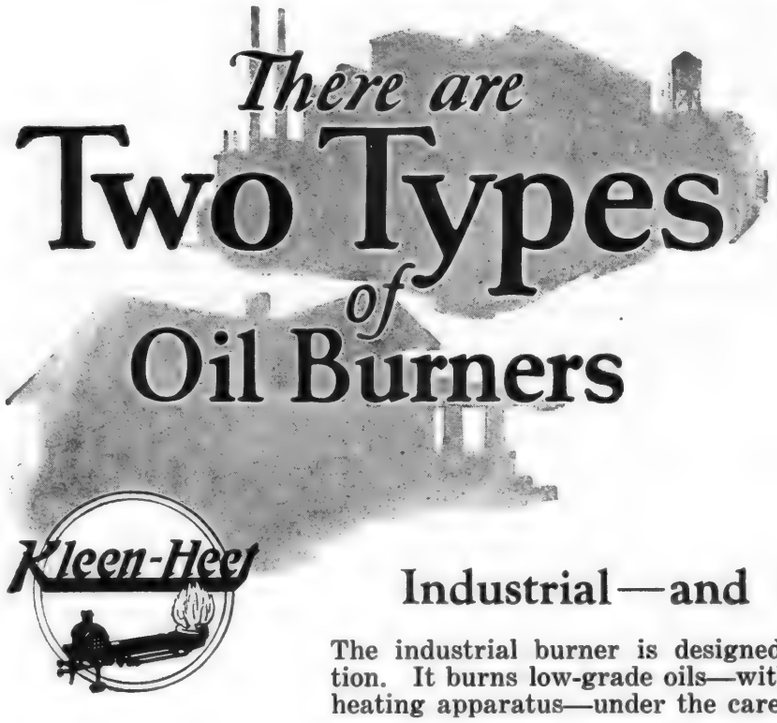
(Scott-Newcomb System)

ELECTROL

Electric Ignition Quiet Operation

AN AUTOMATIC OIL BURNER

ENGINEERED TO A STANDARD—BUILT COMPLETE AT THE FACTORY



There are
Two Types
of
Oil Burners

Kleen-Heet

Industrial—and *Household!*

The industrial burner is designed for continuous operation. It burns low-grade oils—with the aid of special preheating apparatus—under the care of a trained engineer.

The household burner is designed to be efficient in intermittent operation, as heat is needed. Automatically—without attention—it must provide clean, odorless, quiet, safe, even, economic heat.

The Winslow Boiler and Engineering Company makes both. Its high standing in both fields is accepted.

Kleen-Heet—considered by engineers an outstanding household oil burner—is not an adaptation of the industrial burner. It is engineered specifically to do one job—and one only—to heat homes to perfection! And it does! Its instant efficiency multiplies the many advantages of oil over other forms of heating. Service costs are reduced to a minimum!

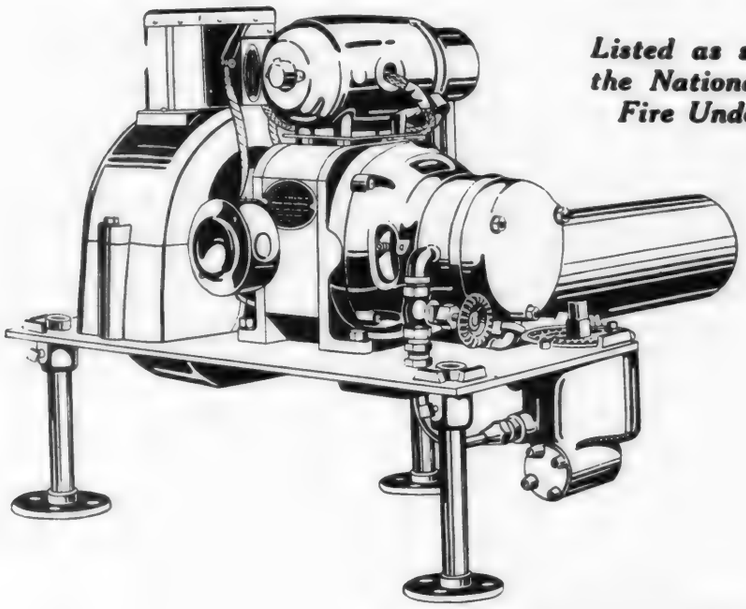
This marked engineering excellence of Kleen-Heet is reflected in a six-year record of successful performance.

Some desirable territory is still available for dealers. Write or wire for profit-making proposition!

WINSLOW BOILER AND ENGINEERING CO.
208 South La Salle Street, Chicago

KLEEN-HEET
With Oil

TESTED AND LISTED AS STANDARD BY THE UNDERWRITERS' LABORATORIES



Listed as standard by the National Board of Fire Underwriters.

AUTOMATIC OIL BURNER

Nu-way

FOR HOME HEATING

Automatic Oil Burners

Now Made in 4 Sizes

When you represent Nu-Way in your locality you are equipped to supply oil heat for any type of building with a maximum of 5000 square feet of steam radiation—hotel, school, office building—down to the 4 or 5 room bungalow with a radiation of but 400 square feet.

The latest addition to the Nu-Way line is the

NU-WAY JUNIOR

For the Smaller Homes

Small in size, it consumes fuel in proportion and is lower in cost. It opens up a field for the sale of oil burners that has never yet been reached. Cash in on it. For further details, prices, and finance plan write

THE NU-WAY CORPORATION

2420 Fourth Avenue **Rock Island, Illinois**

Suppose you had the profit on every Ford sold in your city

This advertisement may bring you just as big a chance.

Someone in your city is going to make a lot of money on

Caloroil 68°-72°

The **"BALANCED TEMPERATURE"** *Oil Burner*

Having a Caloroil selling franchise is like having money in the bank. It is backed up by six selling points, all necessary to make a real success of oil burners.

1. Caloroil gives satisfaction wherever it is installed. We are not obliged to bring out new models next year to correct this year's mistakes.

2. Caloroil is backed by a company of enormous resources which will stand behind you 100%. It is big enough to make all the burners you can sell when the big rush comes.

3. Caloroil is listed as standard by the National Board of Underwriters and approved by The New York City Board of Standards.

4. Caloroil has killed the jinx of the oil burner business—"service". When you sell a Caloroil, it stays sold. Your customers are friends.

5. Caloroil can be sold on fuel saving. Many users have saved 25% over the cost of coal. It burns Fuel Oil—28° Baume.

6. Caloroil is now starting a big advertising campaign which will make sales easy for you. We will turn over to you valuable leads from your territory.

Before you decide on the type of burner you will handle, be sure of every one of these points.

Ask us about a Caloroil Franchise in your city.

CALOROIL BURNER CORPORATION,

Dept. C1, 5 East 40th Street, New York City.

A Superior Product!

Made for those who are not satisfied with anything but the best!

Use proves its worth!

Marr Oil Heat Machine

U. S. Patent No. 1158058
Oct. 26, 1915

You who are in doubt about the practicability and freedom-from-trouble of Oil Burners, will have your doubt removed by investigating the "Marr."

It is simple—it is safe—it measures and feeds the exact amount of oil.

It can't flood—it spreads the flame, creating **quiet** combustion.

It is clean—free from smell, soot, smudge, or smoke.

Its high combustion efficiency solves the problem of the difference between **economy** and waste!

The Marr Heat Machine through merit alone has deserved its success. It answers many questions Heating Engineers want to know. Our Catalogue explains—request it.

Distributors who know how to sell and can do skillful installations are eligible as our agents!

If you can qualify, write us.

MARR OIL HEAT MACHINE CORPORATION

97 South 11th Street, Minneapolis, Minn.

Member American Oil Burner Association

A Typical Installation

IN the St. Mary's College, South Bend, Indiana, Bishop & Babcock packless Multiflex valves and No. 3 Multiflex traps were selected for use. Selection of this equipment was based on satisfactory past performance, made possible by long years of manufacturing experience and unexcelled facilities for production of products in this class.

The trade mark "Multiflex" on heating specialties is an assurance of satisfactory service.

Multiflex Valves

No. 1—Cap and Body heavy bronze castings. Metal to metal joints.

No. 2—Multiflex Bellows forming packless wall. Absolutely packless.

No. 3—Large Port in valve through which steam passes.

No. 4—Two Turns of handle fully opens or closes the valve.

Multiflex Traps

No. 1—Body and Cover of Multiflex Return Trap are heavy brass castings, metal-to-metal joints.

No. 2—Thermal Member is seamless one-piece Multiflex metal bellows.

No. 3—Conical Valve always insures positive seating. Made of the best steam brass.

No. 4—Brass Seat has sharp edge, prevents accumulation of dirt and scale. Seat is renewable.

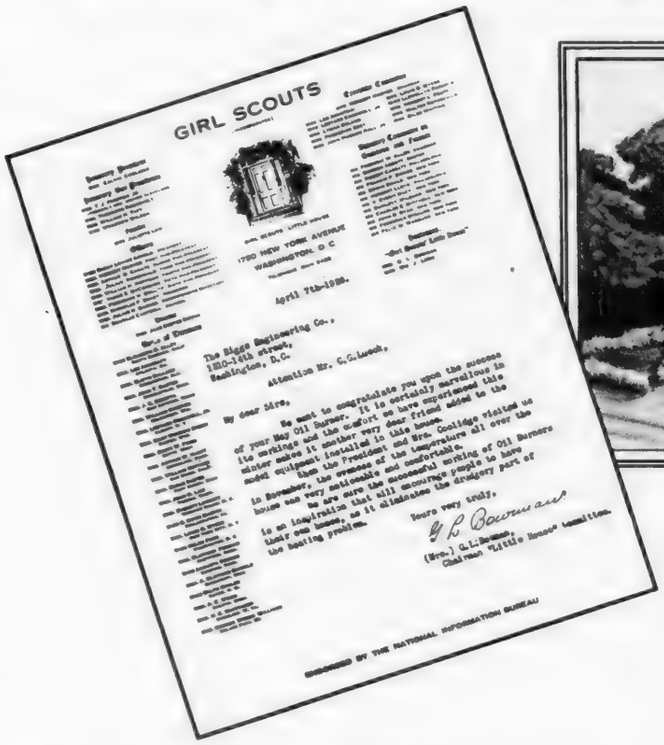
THE BISHOP & BABCOCK SALES CO.
General Offices CLEVELAND, OHIO

GILHAM, COOK & WHITE, *Engineers*
Kansas City, Mo.

J. E. HANEY, *Heating Contractor*
South Bend, Indiana

BISHOP & BABCOCK
HEATING SPECIALTIES

Installations like this bring national recognition to the Quiet May—and steady profits to Quiet May dealers


GIRL SCOUTS

1700 NEW YORK AVENUE
WASHINGTON, D. C

April 7th-1928.

The Riggs Engineering Co.,
1810-14th street,
Washington, D.C.

Attention Mr. C.G.Lamb,

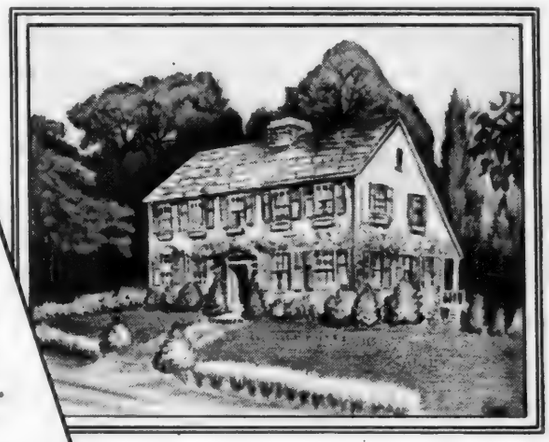
My dear Sirs,

It is certainly surprising to
of your May Oil Burner. comfort we have experienced this
its working and the cleanliness in
winter since it was installed in dear friend added to the
model equipment. President and Mrs. Coolidge visited us
Then the evenness of the temperature all over the
In November, noticeable and comfortable.
house was very we are sure the successful working of Oil Burners
In inquiries that will encourage people to have
their own homes, as it eliminates the drudgery part of
the heating problem.

Yours very truly,

(Mrs.) G.L.Bowman,
Chairman "Little House" Committee.

SPONSORED BY THE NATIONAL INFORMATION BUREAU



The Girl Scouts "Little House", Washington, D. C. Mrs. G. L. Bowman, Chairman of the "Little House" Committee, is enthusiastic in her praise of the perfected oil burner. "When the President and Mrs. Coolidge visited us in November," Mrs. Bowman writes, "the evenness of the temperature all over the house was very noticeable and comfortable."

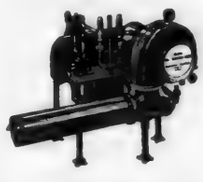
PROMINENT men and women from all parts of the country have visited the Girl Scouts "Little House" at Washington, D. C.—have been impressed by the quiet, unvarying heat-comfort of the Quiet May installed there. Installations like this are building the business of Quiet May dealers everywhere.

The May is really noiseless. It is safe, being listed as standard by the Underwriters' Laboratories, Inc., of Chicago, and approved by the Board of Standards and Appeals of New York.

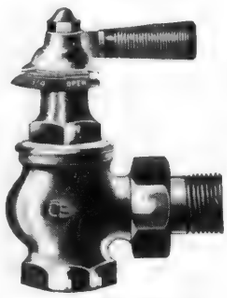
Because the Quiet May has no complicated machinery to get out of order, dealers rarely have to give service on their installations. The result is bigger profits—satisfied customers—and a constant increase in business.

Investigate the Quiet May! Let us prove to you that it will increase *your* oil burner sales. Quiet May dealers all over the country are profiting by our strikingly effective advertising in leading newspapers and magazines. Write us today for complete information and prices. Address May Oil Burner Corporation, Baltimore, Md.; 331 Madison Ave., New York; 1020 Commonwealth Ave., Boston; 2401 Chestnut St., Philadelphia; 503 Security Bldg., St. Louis.

Quiet May

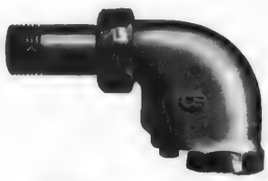


AUTOMATIC OIL BURNER

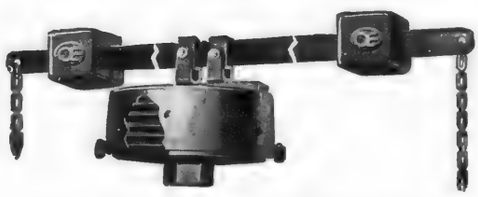


O-E Improved Perfect Packless Graduated Supply Valve.

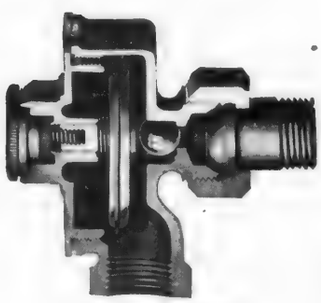
O-E Improved Air Exhauster and Vacuum Valve



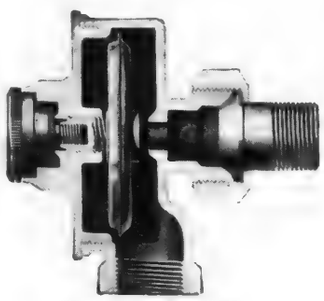
O-E Improved Perfect Ball Check Water Seal Return Fitting.



O-E All Metal "3 in 1" Combination Damper Regulator.



O-E No. 2 Thermo-Nickel Return Trap.



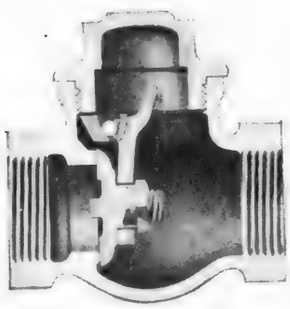
O-E No. 1 Thermo-Nickel Return Trap.

3-in-1

Heating Specialties

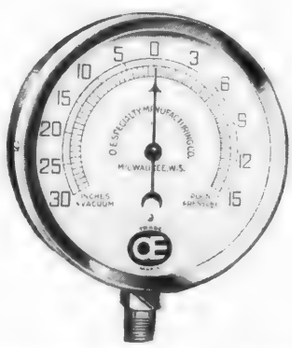
form the simplest and most flexible heating system ever devised. Operating on the thermos bottle principle, it provides VAPOR part of the time—VACUUM most of the time—PRESSURE when desired. Let us send you positive proof of the way in which the O-E System has enabled heating engineers to solve expeditiously and economically requirements of their clientele.

Send for Complete Catalogs.



O-E Rouse Type Balanced Swing Check Valve.

O-E Direct Differential Return Trap.



O-E Compound "3 in 1" Gauge.

O-E SPECIALTY MFG. CO.
12 Keefe Ave. Milwaukee, U. S. A.

THE SEAL OF SIMPLICITY

3 in One Heating

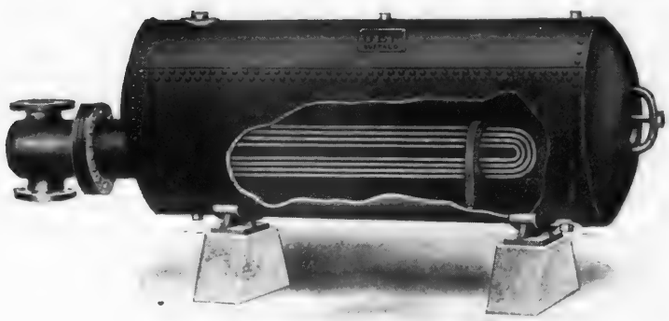
combines the advantages of

VAPOR-VACUUM-PRESSURE

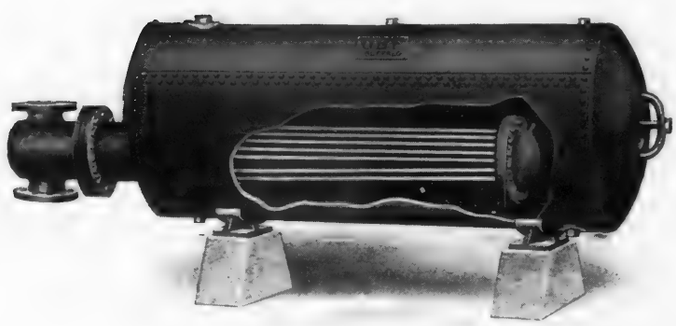
FRANKly Speaking for Dependable Service

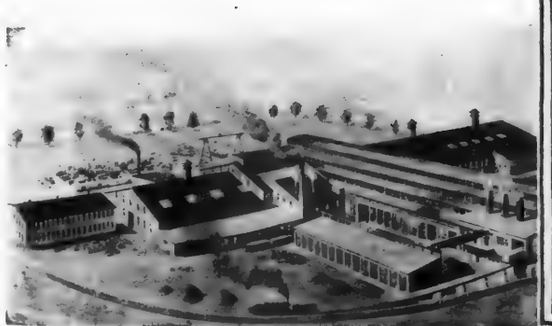
A large manufacturer of automobiles advertised DEPENDABLE SERVICE, because that company knew the car they manufacture could give only Dependable Service, since in their automobiles they put Quality, Quantity and First Class Workmanship.

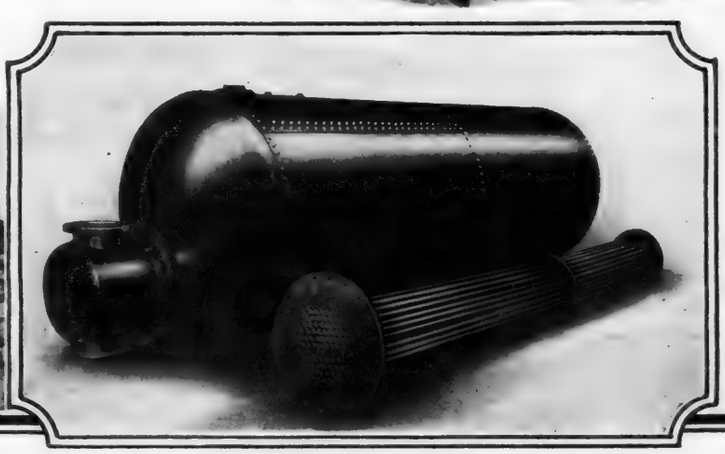
For the same reasons O. E. F. Heaters will give Dependable Service. O. E. F. Storage Heaters are made in the U-tube and Straight Tube types. The Steel used throughout is Flange Quality on which we will furnish the chemical analysis and physical test. Heavy gauge seamless drawn copper tubes expanded into rolled steel tube sheets insure continued Dependable Service.



Tanks and parts for all sizes carried in stock. O. E. F. Service is different. Prices are low, Deliveries prompt and Heater Quality the best.

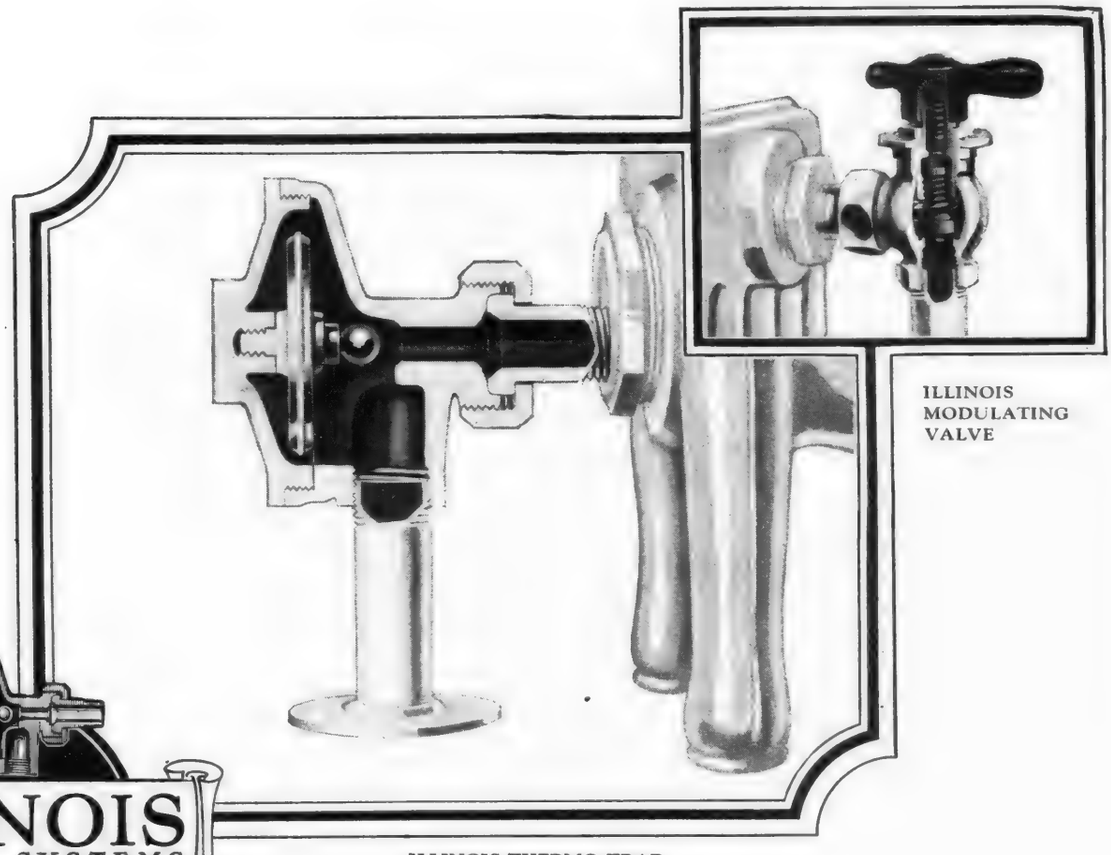






O. E. Frank Heater & Engineering Co., Inc.

Factory and Offices — BUFFALO. N. Y.



ILLINOIS MODULATING VALVE

ILLINOIS THERMO TRAP

ILLINOIS
HEATING SYSTEMS

"The Factor of Safety"

The ILLINOIS Thermo Trap, while ordinarily used at low pressures, is built strong enough to operate on pressures up to 100 pounds without damage to the sensitive diaphragm.

These traps with their wide margin of reserve strength and safety have established a remarkable record for durability and long life. In fact, hundreds of ILLINOIS Thermo Traps have been known to operate faithfully for 15 years or more without diaphragm replacements or attention of ANY sort.

The nation-wide popularity that ILLINOIS HEATING SYSTEMS have enjoyed for so many years is due to the ruggedness—the dependability built into all ILLINOIS Products. They outclass and outlast—as proven by years of faultless operation.

ILLINOIS Thermo Trap

The Original Vertical Seat Trap. Permanently adjusted—self cleaning. Vertical seat avoids trouble by stoppage from dirt. Ball and cone seat; the best known type; seats perfectly at all times. Sensitive and accurate in operation because the diaphragm closes AGAINST the steam—not IN it. Will withstand 100 pounds steam pressure—a real test. The use of these traps is positive insurance against the usual heating troubles.

ILLINOIS Modulating Valve

Graduated, Quick-Opening, Packless. Bakelite insulated handle, never gets hot. Half turn from full open to closed. Dial shows position of valve.

Let us tell you more about them in Bulletin 21

REPRESENTATIVES IN 40 CITIES OF U.S.A.

ILLINOIS ENGINEERING COMPANY

ROBT. L. GIFFORD President INCORPORATED 1900

CHICAGO

Heating Theatres

With the Barnes & Jones System and Over Twenty-five Years of Experience

The REPERTORY THEATRE *of* BOSTON

J. Wm. Beal Sons, Architects R. D. Kimball Co., Engineers James S. Cassedy, Heating Contractor

ALL heating apparatus for this beautiful structure had to be of uniform and proven quality. Not alone the auditorium, but public meeting halls, office and class rooms of the Repertory Work Shop—all under the same roof—must be heated.

BECAUSE Barnes & Jones equipment has proven absolutely satisfactory in many other theatre installations, it was adopted for the buildings of the Repertory Theatre.

VAPOR and VACUUM HEATING SYSTEMS of PROVEN QUALITY

Barnes & Jones

Representatives in Principal Cities

5 Melrose Street ***Boston, Massachusetts***

The Dunham Building

The Administrative and General Offices of the C. A. Dunham Co. and allied industries are now located in the new 9-story Dunham Building. This modern structure at 450 East Ohio Street is but a stone's throw from Lake Michigan. We invite you to visit us when you are in Chicago.

It stands as a symbol of service

THE newly erected and recently occupied Dunham Building is more than a mere home for the Administrative and General Offices of the C. A. Dunham Co., and affiliated industries.

It stands as a symbol of service to the heating field in which the activities of the company have been centered for more than two decades. It reflects the beauty of design, quality of material and durability of construction of the Dunham Products and exemplifies the dominant power of an ideal as applied to America's heating problems.

Commencing with the pioneer invention of Mr. C. A. Dunham—the Dunham Thermostatic Radiator Trap—and extending down through the evolution of the Packless Radiator Valve, Float and Thermostatic Traps, Return Traps and other attributes of modern heating engineering, the service of this company has been dedicated to the development of Vacuum and Vapor Heating utilizing low pressure steam.

So we say that the new Dunham Building symbolizes the service which Dunham Heating Service has rendered, and will continue to render, in inventions, in advanced heating methods and in developing Heat, Health and Happiness through the application of Dunham Principles.

Over sixty branch and local sales offices in the United States and Canada bring Dunham Heating Service as close to your office as your telephone. Consult your telephone directory for the address of our office in your city.

C. A. DUNHAM CO.

Dunham Building, 450 East Ohio Street, Chicago

The DUNHAM REG. TRADE MARK HEATING SERVICE

Davis Gardens, J. W. Davis Company, Terre Haute, Indiana. Lord and Burnham Co., Builders. Frox & Burget, Heating Contractors. Equipped with a Webster Vacuum System of Steam Heating. Webster Service rendered by the Indianapolis office of Warren Webster & Company.

[1] [2] [3]

(1) *Aerial view.* (2) *Showing Webster Hydro-Pneumatic Tank and pumps controlled by Webster Vacuum Governors.* (3) *Typical interior.*

29 Acres of Tropical Heat with "below zero" weather outside

Other notable greenhouses equipped with Webster Systems of Steam Heating include:

Batavia Greenhouse, Batavia, Ill.
Davis-Harrison Greenhouse Ottawa, Ill.
Armacost Greenhouse, Sawtelle, Calif.
DuPont Estate Greenhouses, Wilmington, Delaware
Candler Greenhouse, Atlanta, Ga.
Davis Aurora Co., Aurora, Ill.
Wellsworth Farm Greenhouse, Belmont, Ill.
Ristow Greenhouse, Indianapolis, Ind.
Fort Scott Greenhouse, Fort Scott, Kansas
A. J. Dean Greenhouse, Grand Rapids, Mich.
Missouri Botanical Gardens. Grays Summit, Mo.
Bourdet Floral Co., St. Louis, Mo.
White Bros. Greenhouse, Medina, New York
Berea Greenhouse, Berea, Ohio
Cook & Newbert Greenhouse, Brooklyn Heights, Ohio
Henrichs Greenhouse, Brooklyn Heights, Ohio
Kerchner Riverside Greenhouse, Cleveland, Ohio
Eaton & Son Floral Co., Conneaut, Ohio
Herms Floral Company, Portsmouth, Ohio
Western Reserve Greenhouse, Rocky River, Ohio
Greenhouse, Brooking, S. D.
Dallas Floral & Nursery Co., Dallas, Tex.
Hollywood Gardens, Seattle, Wash.
Hotel Tacoma Greenhouse, Tacoma, Wash.
Glenrose Greenhouse, Spokane, Wash.
Rentschler Greenhouse, Madison, Wis.

WHEN the sun is shining, almost any kind of heating system will keep a greenhouse warm. It's the biting blasts of the long Winter nights that must be tempered with *unfailing* warmth. And that's one reason a Webster System of Steam Heating was selected for Davis Gardens, probably the world's largest greenhouse establishment, situated at Terre Haute, Ind.

In this monster garden of 29 glassed-in acres, a Webster System stands guard over an investment of nearly two million dollars. When the north wind howls, and the thermometer flirts with zero, a Webster System of Steam Heating keeps millions of tender young plants from harm with a summer-like inside temperature.

Let us show you how Webster Service helps on greenhouse heating problems—in fact, on *any* heating problem.

Warren Webster & Company

Pioneers of the Vacuum System of Steam Heating

Camden, N. J. **50 Branch Offices**

In Canada, Darling Bros., Ltd., Montreal

– since 1888

Webster Systems of Steam Heating

More than 37,000 installations in America's finer buildings

Trane Undivided Responsibility Heating in Standard's Chicago Branch

The Standard Sanitary Building, Chicago, Illinois. Architect: Alfred Alschuler, Inc. Heating Contractor: C. W. Johnson.

This advertisement is No. 3 of Trane's Undivided Responsibility Series.

The Standard Sanitary Mfg. Co. handled Trane heating specialties and pumping equipment long before they built the new office building, warehouse, and garage shown in the illustration above.

And so when they did build, there was no guesswork about the heat. They used a Trane Undivided Responsibility Vacuum System.

The installation has 114 Trane Bellows-Packless Supply Valves, 140 Trane Bellows Radiator Traps, and an RD 3020 Trane Duplex Return Line Vacuum Pump.

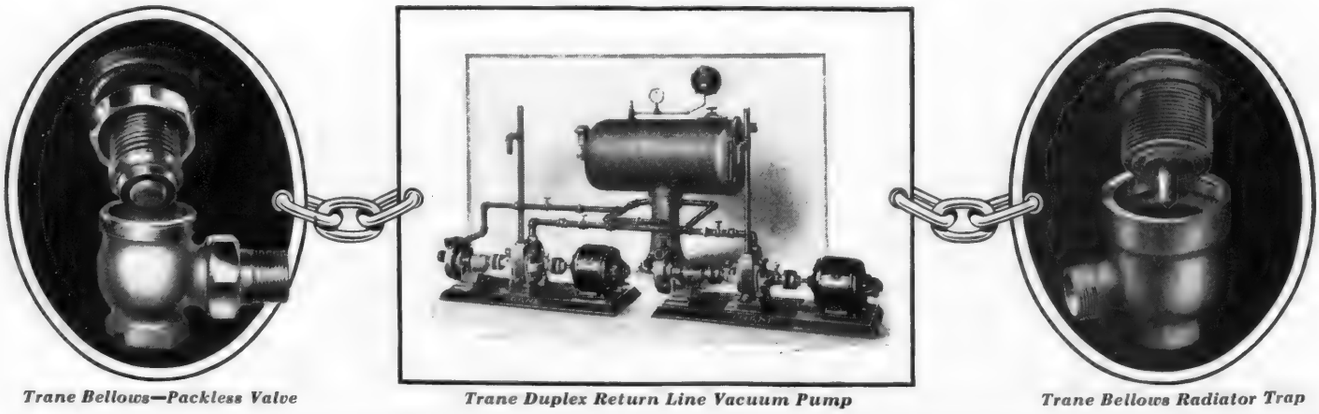
It is, therefore, a Trane job in every sense of the word, and Trane alone is responsible for its operation. For this reason, the telegram that Standard Sanitary recently sent to Denver, Colorado, in answer to an inquiry regarding Trane Systems is particularly significant. The telegram reads:

> WE HAVE COMPLETE TRANE SYSTEM INCLUDING THIRTY THOUSAND FOOT DUPLEX VACUUM PUMP IN OUR OWN OFFICE BUILDING WAREHOUSE AND GARAGE AT CHICAGO GIVING ENTIRE SATISFACTION SECOND SEASON

The significance of this telegram, of course, is that Trane's Undivided Responsibility way of doing business is, to say the least, entirely satisfactory.

Some mighty interesting details are ready for you whenever you are ready for them. Write for Trane literature.

THE TRANE COMPANY, 206 Cameron Ave., La Crosse, Wis., manufacturers of vapor and vacuum heating specialties and pumps. Branches and sales connections at New York, Chicago, Boston, Cincinnati, Newark, Philadelphia, Buffalo, Cleveland, Detroit, Seattle, Los Angeles, Albany, Minneapolis, Salt Lake City, Greensboro, N. C., Zanesville, Ohio, Tampa, Fla., Baltimore, Md., Des Moines, Ia., New Haven, Conn., Sheboygan, Wis. In England: 22-23 Clerkenwell Close, London, E. C. 1. In Canada: The Trane Co., 23 River St., Toronto, 2; Thomas Robertson & Co., 134 Craig St., West, Montreal; F. S. Murdoch, 310 Broadalbane, Winnipeg: A. B. Madden, 48 Sparks St., Ottawa. In China: C. J. Doughty & Co., 7 Jinkee Road, Shanghai.



Trane Bellows—Packless Valve *Trane Duplex Return Line Vacuum Pump* *Trane Bellows Radiator Trap*

1. Eliminates expansion tank.
2. Quickly installed on new or old jobs.
3. Water in system always fresh.
4. More rapid circulation in system.
5. Supply, relief and damper regulation entirely automatic.
6. Important savings in fuel.
7. Absolutely safe and dependable in operation.
8. All valves positive in action, durable and reliable.
9. Higher boiling point of water than in expansion tank system.

Scoring a decisive hit

among owners of hot water systems

The number of owners who put in Mueller Automatic Heat Control Systems during the last 12 months **doubled** the number that installed this system the previous year. Every day, as more and more owners are discovering the big advantages of this system, its popularity gains bigger momentum.

Hot water owners like the Mueller system because it is automatic—gives them automatic supply of water, automatic pressure relief—and automatic damper control that affords important fuel savings. They like it because the automatic features are **safe**. Because the expansion tank is eliminated—and with it, all expansion tank troubles. Because this system provides more rapid circulation and gives more even heating. Because this system is backed by a responsible manufacturer with 69 years' experience.

Double *your* sales with this system, too

Without question sales of Mueller systems are going to break all records by next fall. You will find it profitable to feature this big profit specialty during summer months. The price is right for quick closing of sales. It costs the owner no more than the unsatisfactory expansion tank system. You can install it on either new or old jobs—at a great saving in labor over the expansion tank system. The owner gets a better, cleaner job—and your margin isn't eaten up by installation costs.

Note the important features of this system listed at the right. Send today for complete information on how you can get your share of this profitable business.

MUELLER CO.

(Established 1857)

Factories: Decatur, Illinois Port Huron, Michigan

Canadian Factory
MUELLER, Limited, Sarnia

Branches
New York, San Francisco, Los Angeles

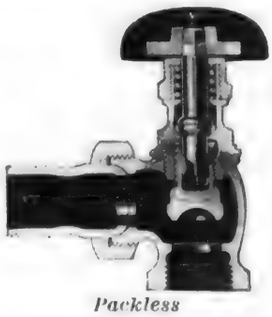
MUELLER

248

Automatic Heat Control System

Marsh Re-enforced Packless Water Radiator Valves

Oval Wheel or Lock Shield



Packless

A Genuine Packless Water Valve Guaranteed to hold any pressure required for forced circulation

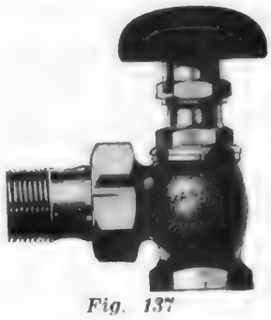


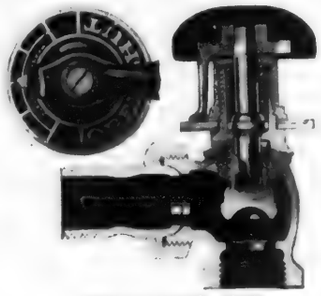
Fig. 137

Marsh re-enforced packless Hot Water Radiator Valves are not only a boon but the answer to hot water heating problems, permitting the same ease of operation and complete temperature control as with steam.

These hot water valves are quick opening, can be operated—opened and closed—with perfect ease by a child and **positively will not stick or leak.**

They will hold high pressure suitable for forced circulation up to any pressure radiation will stand, and cost no more than the cheap competition valves.

Marsh Re-enforced Graduated Water Radiator Valves



Water Graduated

Oval Wheel, Lever Handle or Lock Shield

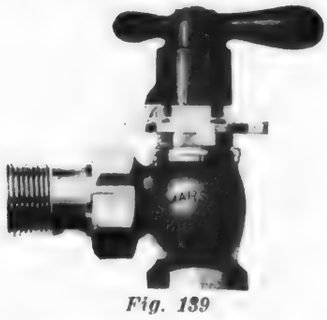


Fig. 139

Something Entirely New in Water Heat Regulation

We have made a special study of hot water heat regulation and control and are pioneers in the matter of individual radiator control, through a graduated valve, employing the same principle as with steam. If you can modulate, graduate, or regulate individual radiator vapor or vacuum steam heat, through a valve, **(and you can)**, then why not by the same principle regulate water heat.

For sleeping rooms, heat regulation with the **Marsh Graduated water valves may be controlled with the same ease of operation** and **certainty of results as is possible with a Modulated valve on a steam system,** and at a much less cost than for a vapor or vacuum system installation.

Further, water circulation for each radiator, graduating for same or balancing of system, can be increased from nothing to full pipe capacity and held or locked at any intermediate point, if desired, by simply turning dial so that stop on same will register against indicator or pointer and locking dial in this position, preventing further opening of valve or turning of wheel or lever handle to the left.

These valves cost but little more than our regular water valves and much less than steam modulated valves.

MARSH VALVE COMPANY

DUNKIRK *Exclusive Sale Distributors* **NEW YORK**

Edward T. Hetherington
1718 Sansom St., Philadelphia

Appleton & Liptrott, Inc.
1480 Broadway, New York

John W. Mabbs,
431 So. Dearborn St., Chicago, Ill.

United States Radiator Corp'n
General Offices: Detroit, Mich.

Jas. P. Marsh & Company
118 So. Clinton St., Chicago, Ill.

All territory east of west lines of Michigan and Ohio and north of Virginia, except New York and Philadelphia.

All territory south of Ohio River and west of Michigan and Ohio, except Cook County, "Chicago, Illinois."

This Display Box has made money for hundreds of heating merchants

IT is the standard shipping container for Airid Air Valves—and it is a silent salesman as well.

Opened up, as in the photograph, it stands on the counter, or in the window, and displays Airid Air Valves to every passer-by.

There's a selling message on the carton itself—and behind it are many millons of Airid advertisements. Put this carton to work for you.

At your jobber or from our nearest branch.

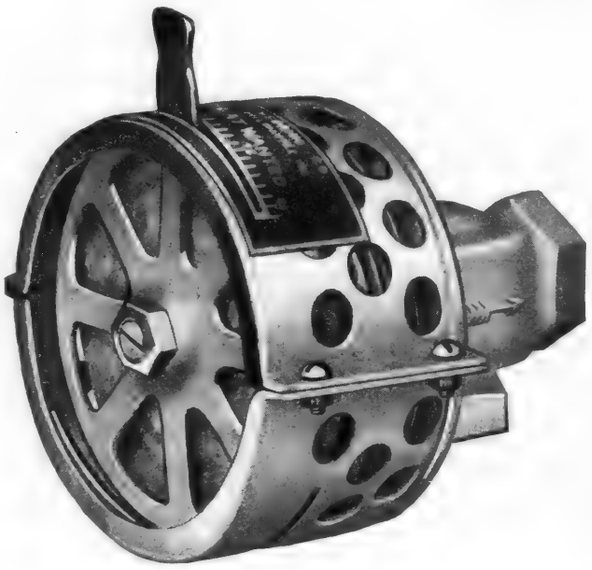
Made and guaranteed by

AMERICAN RADIATOR COMPANY

Specialties Department

816 So. Michigan Ave., Chicago, Ill.

Sterlco
TRADE MARK



The Thermotrol

A Simple Device Installed as Easily as a Radiator Valve.

Controls Room Temperatures Accurately, as Has Been Demonstrated by Many Hundreds of Controls Installed and Thoroughly Tried under Service Conditions on Installations from Coast to Coast.

LOW IN FIRST COST—NO UPKEEP

Write for Bulletin 38

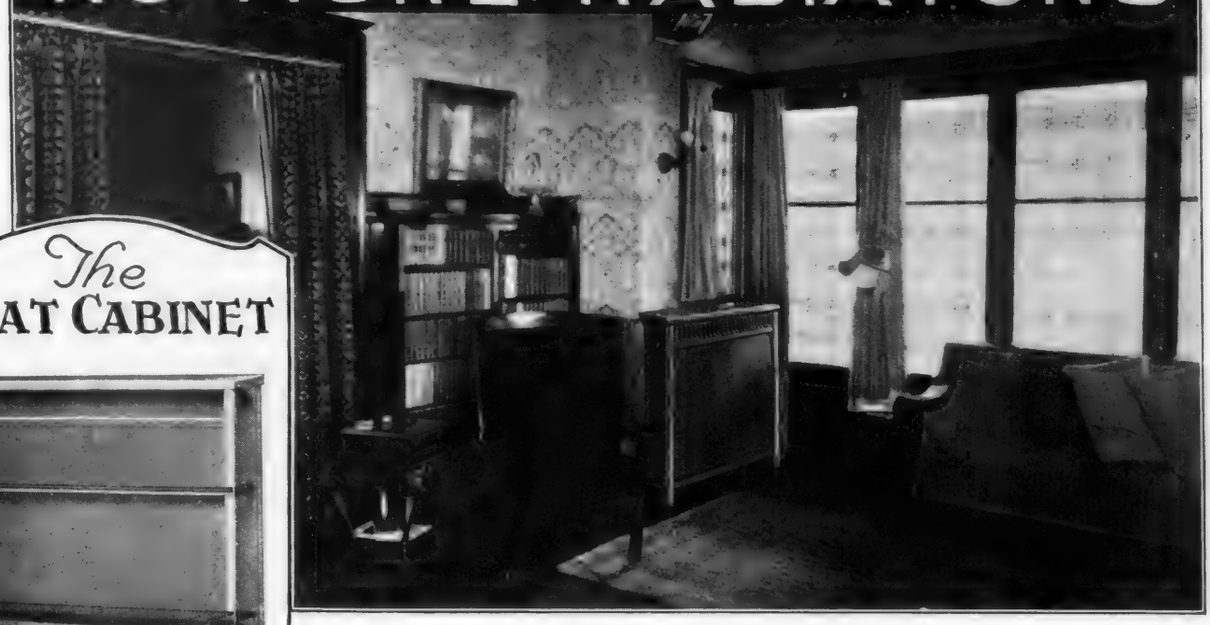
STERLING ENGINEERING COMPANY

1626-44 Holton Street

Milwaukee Wisconsin

REPRESENTATIVES IN ALL LARGE CITIES IN UNITED STATES AND CANADA

NO MORE RADIATORS



The HEAT CABINET

Patents Pending.

The Heating Unit is placed in the lower part of the Cabinet, as illustrated. It is made up of copper fins placed upon a U-tube by a patented process. Due to this process the fins are kept at a temperature very near the temperature of the U-pipe itself.

Air passing through these fins, up through the Cabinet, gains great velocity due to its expansion after passing over the heated surfaces.

The operation of the Heat Cabinet, therefore, depends almost entirely upon convection, and the amount of heat given off is easily regulated by controlling the amount of air that is allowed to pass through the heater. This result is accomplished by means of the simple damper arrangement shown, thus giving for the first time absolutely perfect heat control on all modern types of heating systems where radiators in the past have been used.

Heat Cabinets are being made in a wide range of sizes and styles for both visible and concealed locations.

TRANE

Heat Cabinets!

Cabinets of heat. Pretty things; a part of the furniture. Artistic, light, efficient, economical; a welcome successor to the unsightly radiator!

Sturdy heat cabinets. Made of metal to last forever. Yet light of weight. A husky little boy can handle one. Made for steam, for vapor, for vacuum, for hot water. Made for big rooms, little rooms; for public buildings, for private homes; visible or concealed.

Costs not announced, but they will be low. The successor to the radiator must not cost more than the shielded radiator it succeeds, even though it is made of copper and brass instead of bulky iron.

Delivery in September. Not adequate delivery, of course, but still enough to take care of most urgent demands.

Literature now. Some color work has already been distributed. Additional test data and other information is ready. Those who submit their names are being kept up with the times.

Questions welcome. Inquiries should be addressed directly to the main office.

THE TRANE COMPANY, 206 Cameron Ave., La Crosse, Wis., U. S. A.

THE SUCCESSOR TO THE RADIATOR

THERMOSTATIC TRAP

Conceived, designed and built to a purpose — the elimination of trap troubles — the ***Milvaco Thermostatic Trap*** embodies in its detail of construction, principal of operation, and accomplishment of purpose, a standard synonymous to the Milwaukee Valve Company.

Backed by twenty-five years of manufacturing experience —A message with a meaning to the discriminating buyer.

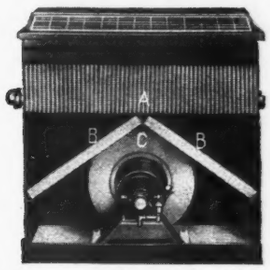
Bulletin No. 23 descriptive in detail of the Milvaco Thermostatic Trap will gladly be mailed you upon request.

MILWAUKEE VALVE CO.

MILWAUKEE, WISCONSIN, U. S. A.

Parsons Senior High School, Parsons, Kansas. Thomas W. Williamson Co., Topeka, Kansas, *Architects*
Workman Plumbing Company, Parsons, Kansas, *Heating and Ventilating Contractors*

"*What* will the future tell?"



Open view of* UNIVENT *illustrating

A—Copper radiator without a single joint, absolutely leak-proof.
B—Air filter easily removable for cleaning.
C—Cone type fan specially insulated for quiet operation.

UNIVENT
(TRADE MARK)
VENTILATION

Perhaps nothing is more irritating to a modern heating and ventilation engineer than to learn that equipment he recommended has "gone wrong"—that it has failed to give the satisfaction he had hoped for. This is only natural since he bases his whole reputation upon the recommendations he makes.

To the heating and ventilation engineer, therefore, we make this invitation—learn the facts about Univent Ventilation. We believe that you will find, as many other heating and ventilation men have already found, that the Univent affords ventilation as nearly perfect as human skill can make it. Year after year its performance will stand as a credit to your knowledge and sound judgment.

The Univent brings fresh air from outdoors, cleans it, warms it, and distributes it gently and evenly throughout the room—without draft. If you are interested in the heating and ventilating of schools, office buildings, hotels and similar buildings, write for the book, "UNIVENT VENTILATION," engineer's edition.

Manufactured only by

THE HERMAN NELSON CORPORATION *Moline, Ill.*

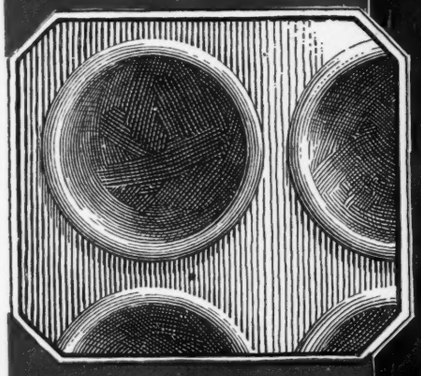
Sales and Service

BELFAST, ME.	PHILADELPHIA	CLEVELAND	DES MOINES	EMPORIA	SPOKANE
BOSTON	SCRANTON	COLUMBUS	MILWAUKEE	OMAHA	PORTLAND
NEW HAVEN	PITTSBURG	TOLEDO	MINNEAPOLIS	KANSAS CITY	SEATTLE
NEW YORK CITY	GRAND RAPIDS	INDIANAPOLIS	ST. LOUIS	DENVER	VANCOUVER
SYRACUSE	DETROIT	CHICAGO	SAN FRANCISCO	SALT LAKE CITY	TORONTO

HEGGIE-SIMPLEX

[FORMERLY SIMPLEX]

ELECTRIC-WELDED STEEL BOILERS



Expanding and beading make tubes water-tight.

Quality Assured by Thorough, Unhurried and Experienced Workmanship

The Heggie-Simplex Boiler combines in one portable, electric-welded steel unit all the recognized advantages of both firebox and return tubular, double pass boilers. It has four distinctive features of fundamental importance:

1. Extra large firebox and direct heating surface.
2. Secondary combustion chamber to provide ample room for complete combustion before entering flues.
3. "Rear-front-rear" passage for the gases.
4. A single, unimpeded, freely circulating body of water.

Made in both smokeless and direct draft types and in a complete range of sizes for bungalows, residences and all larger installations.

QUALITY workmanship unites with quality material and the latest approved design to make Heggie-Simplex Heating Boilers a quality product throughout.

All Heggie-Simplex workmen are carefully trained under the time-honored apprenticeship plan. Only skilled workmen are utilized. The day work basis is employed throughout, to insure careful, thorough, unhurried craftsmanship. No green hands—no piece-work—no records for speed. The emphasis is always on *quality*.

Our rigid, step-by-step inspection in process prevents hasty, careless or faulty work—and makes possible our guaranty of the materials and workmanship in every Heggie-Simplex Boiler, as well as the capacities for which they are rated.

Detailed specifications and illustrated catalog on request.

HEGGIE-SIMPLEX BOILER COMPANY, Joliet, Illinois

Representatives in

Akron		
Albuquerque	Chicago	Detroit
Amarillo	Cincinnati	Duluth
Atlanta	Cleveland	Elmira
Baltimore	Columbus	El Paso
Birmingham	Dallas	Fort Wayne
Buffalo	Davenport, Ia.	Harrisburg
Casper	Dayton	Houston
Charlotte	Denver	Indianapolis
Chattanooga	Des Moines	Jacksonville

ELECTRIC-WELDED HEGGIE-SIMPLEX STEEL BOILERS

Representatives in

Joliet		
Kan. City, Mo.	New York	Schenectady
Little Rock	Okla. City	Shreveport
Louisville	Omaha	Spartanburg
Lubbock	Philadelphia	St. Louis
Memphis	Pittsburgh	Tampa
Milwaukee	Raleigh	Toledo
Minneapolis	Rochester	Tulsa
Nashville	Rockford	Youngstown, O.
New Orleans	San Antonio	Waterloo, Ia.

Just look up "Heggie-Simplex Boiler Co." in the phone book in any of the above cities for representative's number and address

The Heating and Ventilating Magazine

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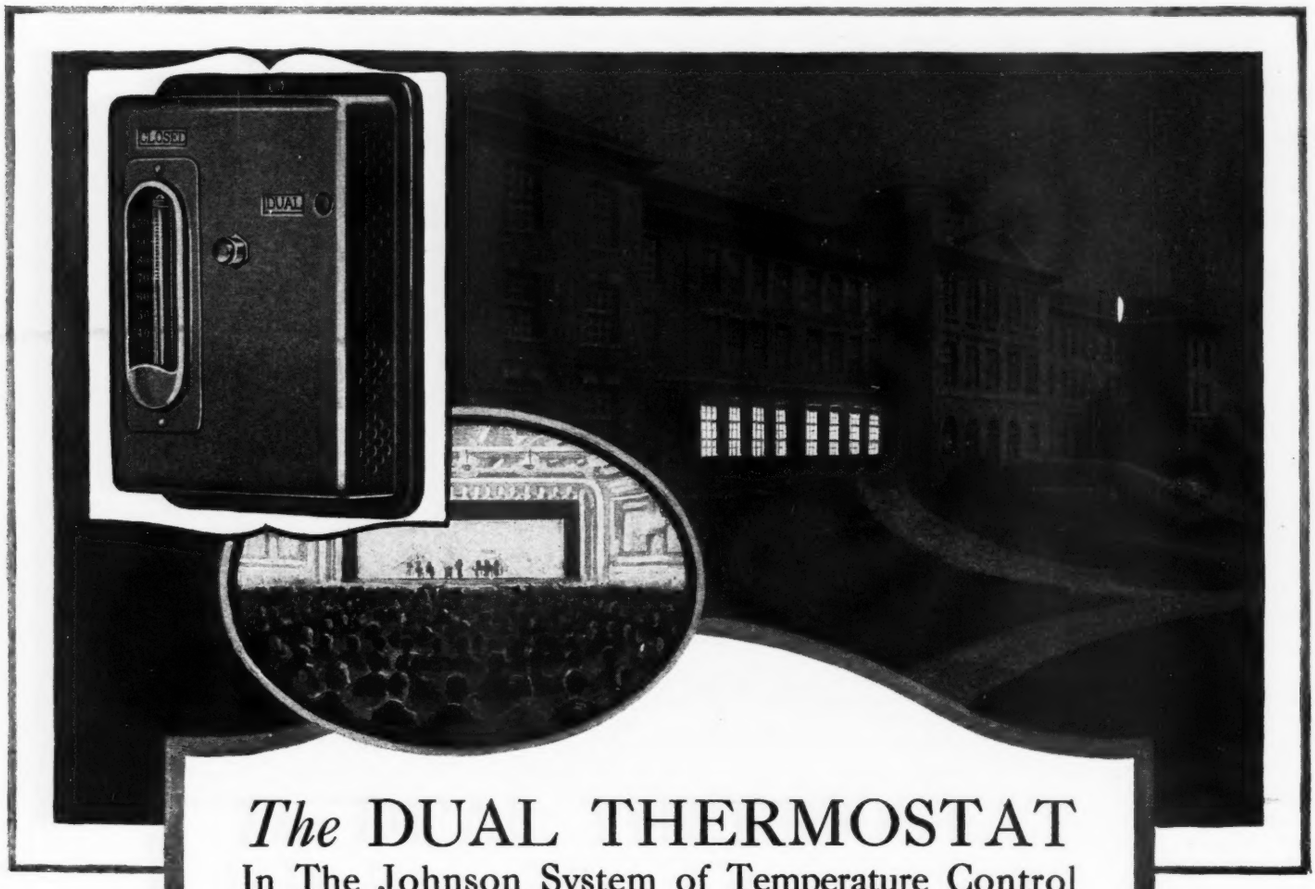

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